

BATTERY POWER PRODUCTS & TECHNOLOGY

Solutions for OEM Design Engineers, Integrators & Specifiers of Power Management Products

2009 Green Edition



Green Technologies & Initiatives *page 8*

One Company's Journey To Go Green *page 10*

Battery Hybrid Technology *page 11*

Battery Recycling *page 13*

Hybrid Electric Vehicles *page 17*

INSIDE

Fuel Cell / Battery Combination Provides Sustainable, Green Solution For Extended Runtime in Telecom Applications *p 11*

Assuming Responsibility for E-Waste Through Recycling: Emerging Issues with Product Stewardship Initiatives *p 13*

IEEE 1625 Battery Standard: Recent Changes to Improve Safety *p 15*

Plug-In Hybrid Electric Vehicles in Stimulus Act: What's in Store for the Battery Industry? *p 17*

PRODUCTS & SERVICES



New Batteries On the Market *p 3*

Integrated Circuits & Semiconductors *p 4*



Power Supplies & Power Conversion *p 6*

Charging & Testing *p 7*

DEPARTMENTS

Industry News *p 18*

Calendar of Events *p 21*

Marketplace *p 21*

R&D *p 22*

www.BatteryPowerOnline.com

Industry News in Brief

Johnson Controls-Saft Announces Plan to Build Lithium-Ion Hybrid Battery Plant in Michigan

Johnson Controls-Saft has released plans to build its first US cell manufacturing facility for lithium-ion hybrid batteries. Subject to final State and local incentives, the company will use an existing Johnson Controls facility in Holland, Mich.

"Battery technology is strategically important to the future of the U.S. automotive industry and the economy at large," said Alex Molinaroli, president of Power Solutions for Johnson Controls. "Our first US plant will bring about 500 jobs to Michigan, and many additional jobs through suppliers and the businesses these employees will support. It is a key element of our broader strategy and commitment to the hybrid vehicle industry in North America."

3M Forms Strategic Relationship with ATL

3M has entered into strategic relationship and an agreement with Amperex Technologies Ltd. (ATL) that will expand the use of Nickel-Manganese-Cobalt (NMC) cathode materials in lithium ion batteries. 3M will become a supplier of NMC cathode materials to ATL and will work jointly with ATL to develop new cathode, anode and electrolyte materials for the fast-growing lithium-ion battery industry. Lithium-ion batteries are used in handheld consumer electronics devices and in automobiles. Under the agreement, 3M granted ATL a license to 3M intellectual property for the use of 3M NMC cathode materials in lithium-ion batteries.

Please look at the mailing label below and read the code in the red box.
Code=A: You are receiving the complimentary issue due to your involvement in the industry. To start your free subscription today, please go to www.BatteryPowerOnline.com and subscribe.
Code=B: Your subscription is about to expire. Go to www.BatteryPowerOnline.com and renew your subscription today.
Code=C: Your subscription is active and current.

DANTONA

INDUSTRIES, INC.

3051 Burns Ave.
 Wantagh, N.Y. 11793
 1-800-DANTONA (1-800-326-8662)
 Toll Free Fax: 1-888-326-8662
 www.DANTONA.com

For all your battery needs!!

Single Cell Nicad/Nimh (Flat Top & Consumer Top)
The most complete line of single cells in the country!!!

Flat top cells for assembly

SUB-C SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#		
			mAh	Dia	Hgt			
SUB-C SIZE	NICD	1/2SC	700	0.906	1.02	1/2SC-700		
		4/5SC	1300	0.906	1.34	4/5SC-1300 **		
		SC	1500	0.906	1.69	SC-1500 **		
			1900	0.906	1.69	SC-1900 **		
			2100	0.906	1.69	SC-2100 **		
			2400	0.906	1.69	SC-2400CS **		
			2300	0.906	1.97	5/4SC-2300		
		** Rapid Charge / High Rate Discharge for Power Tool						
		NIMH	4/5SC	2000	0.906	1.34	4/5SCR-2000NM **	
			SC	3300	0.906	1.69	SCR-3300NM **	

Gold Peak is mfg of cells with "GP" in PT#

AF SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#		
			mAh	Dia	Hgt			
AF SIZE	NICD	1/3AF	250	0.67	0.67	1/3AF-250		
		2/3AF	700	0.67	1.1	2/3AF-700		
		4/5AF	1400	0.67	1.69	4/5AF-1400		
		AF	1500	0.67	1.97	AF-1500		
		5/4AF	2000	0.67	2.63	5/4AF-2000-GP		
		Dantona stocks the most complete line of single cells in the country !!						
		NIMH	NIMH	1/3AF	500	0.67	0.67	1/3AF-500NM
				2/3AF	1100	0.67	1.1	2/3AF-1100NM-GP
				2100	0.67	1.69	4/5AF-2100NM-GP	
				4/5AF	2000	0.67	1.69	These cells replace Sanyo: HR-4/5AU
AF	2500			0.67	1.97	4/5AF-2500NM-GP		
	2700			0.67	1.97	AF-2700NM		
4/3A (17MM)	3800			0.67(17mm)	2.63	4/3AF-3800NM-GP		
	These cells replace Sanyo: HR-4/3AU							
	4/3AF-3800NM							
	4/3AF-4500NM-GP							
4/3A (18MM)	4500	0.67(17mm)	2.63	4/3AF-4500NM-GP				
	These cells replace Sanyo: HR-4/3FAUX							

Unless otherwise indicated, all capacity is based on standard charge / discharge rates for all cells
 "CS" on end of Part Number means cell comes in cardboard sleeve, not shrink wrap.

Flat top cells for assembly

AA SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#		
			mAh	Dia	Hgt			
AA SIZE	NICD	1/3AA	150	0.57	0.67	1/3AA-150		
		1/2AA	250	0.56	0.94	1/2AA-250SHORT		
		2/3AA	400	0.57	1.18	1/2AA-400		
		AA	600	0.55	1.97	AA-600FT		
		AA	800	0.55	1.97	AA-800FT		
		AA	1000	0.55	1.97	AA-1000FT		
		Dantona stocks the most complete line of single cells in the country !!						
		NIMH	NIMH	1/3AA	300	0.57	0.67	1/3AA-300NMF
				1/2AA	500	0.56	0.94	1/2AA-500NM-SHORT
				2/3AA	750	0.57	1.18	1/2AA-750NM-GP
4/5AA	1200			0.57	1.65	4/5AA-1200NM		
AA	1600			0.55	1.97	AA-1600NMF		
AA	1800			0.55	1.97	AA-1800NMF		
AA	2100			0.55	1.97	AA-2100NMF		
5/4AA	2200	0.55	2.64	5/4AA-2200NMF				

Need a large quantity of cells, Lets get you a better price !!

Flat top cells for assembly

AAA SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#		
			mAh	Dia	Hgt			
AAA SIZE	NICD	AAA	300	0.414	1.75	AAA-300FT		
		Gold Peak is the manufacturer of cells with "GP" in the part number.						
		NIMH	NIMH	1/4AAA	110	0.41	0.43	1/4AAA-110NM-GP
				1/3AAA	170	0.41	0.56	1/3AAA-170NM-GP
				1/2AAA	350	0.41	0.9	1/2AAA-350NM-GP
				2/3AAA	400	0.41	1.15	2/3AAA-400NM
				4/5AAA	500	0.41	1.43	4/5AAA-500NM-GP
				AAA	750	0.41	1.72	AAA-750NMF
				AAA	950	0.41	1.72	AAA-950NMF
				5/4AAA	800	0.41	1.96	5/4AAA-800NM

AAAA (QUAD A)	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#
			mAh	Dia	Hgt	
AAAA (QUAD A)	NICD	1/3AAAA	100	0.34	0.60	1/3AAAA-100NM-GP
		1/2AAAA	180	0.34	0.82	1/2AAAA-180NM-GP
		2/3AAAA	200	0.34	1.15	2/3AAAA-200NM-GP
		AAAA	300	0.34	1.6	AAAA-300NM-GP
		5/4AAAA	500	0.34	2.05	5/4AAAA-500NM-GP

Flat top cells for assembly

PRISMATIC CELLS	NICD	Cell Size	Capacity	Size (mm)		Dantona PT#
			mAh	Length / Width / Thick		
PRISMATIC CELLS	NICD	PRISMATIC	1200	67 x 17 x 6.1	HF-A1U	
		PRISMATIC	800	48 x 17 x 6.1	HF-B1UX	
		PRISMATIC	600	37.5 x 17 x 6.1	HF-C1U	
		PRISMATIC	500	24 x 15 x 6.3	HF-D4U	

NOTE: Some cells are slightly different in size from Sanyo original cells. Please be sure to request samples to assure size before assembling into packs where size is an issue.

Flat top cells for assembly

C SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#
			mAh	Dia	Hgt	
C SIZE	NICD	1/2C	700	1.02	0.946	1/2C-700FT
		3/5C-1100	1100	1.02	1.18	3/5C-1100
		C	2500	1.02	1.97	C-2500FT
		C	3000	1.02	1.97	C-3000FT
Don't see an item, Call Dantona, we probably have it.						
NIMH	C	4500	1.02	1.97	C-4500NM	

D SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#
			mAh	Dia	Hgt	
D SIZE	NICD	1/2D	2400	1.34	1.5	1/2D-2400
		D	5000	1.34	2.4	D-5000FT
When you think batteries, think DANTONA !!						
NIMH	NIMH	1/2D	5000	1.34	1.5	1/2D-5000NMF
		D	9000	1.34	2.4	D-9000NM

F SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#
			mAh	Dia	Hgt	
F SIZE	NICD	4/3D (F)	7000	1.34	3.6	F-7000
		NIMH	4/3D (F)	13000	1.34	3.6

BUTTON CELLS	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#		
			mAh	Dia	Hgt			
BUTTON CELLS	NICD	30	30	0.46	0.21	30SS		
		60	60	0.61	0.23	60SS		
		200	200	0.98	0.33	200SS		
		Dantona stocks more single cells than anyone in the country.						
		NIMH	NIMH	40	40	0.46	0.21	40SSNM
				80	80	0.61	0.23	80SSNM
250	250			0.99	0.25	250SSNM		
320	320	0.99	0.33	320SSNM				

CUSTOM MADE PACKS

Did you know that Dantona assembles custom packs in all shapes, sizes and configurations. Contact us for details.

Consumer use cells

Consumer cells perform the same as "Flat Top Cells" however they have a raised top that allows them to make contact in consumer devices and chargers.

AA SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona Part No.
			mAh	Dia	Hgt	
AA SIZE	NICD	AA	600	0.55	1.97	AA-600
		AA	800	0.55	1.97	AA-800
		AA	1000	0.55	1.97	AA-1000
Call 1-800-DANTONA (1-800-326-8662) FOR SAME DAY DELIVERY.						
NIMH	NIMH	AA	1600	0.55	1.97	AA-1600NM
		AA	1800	0.55	1.97	AA-1800NM
		AA	2100	0.55	1.97	AA-2100NM
		AA	2500	0.55	1.97	AA-2500NM

AAA SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#
			mAh	Dia	Hgt	
AAA SIZE	NICD	AAA	350	0.414	1.75	AAA-350
		When you think batteries, think DANTONA !!				
NIMH	NIMH	AAA	750	0.414	1.75	AAA-750NM
		AAA	900	0.414	1.75	AAA-900NM

C SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#
			mAh	Dia	Hgt	
C SIZE	NICD	C	2000	1.02	1.97	C-2000
		C	2500	1.02	1.97	C-2500
		C	3000	1.02	1.97	C-3000
Don't see an item, Call Dantona, we probably have it.						
NIMH	C	4500	1.02	1.97	C-4500NM	

D SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#
			mAh	Dia	Hgt	
D SIZE	NICD	D	4000	1.34	2.4	D-4000
		D	5000	1.34	2.4	D-5000
When you think batteries, think DANTONA !!						
NIMH	D	9000	1.34	2.4	D-9000NM	

9V SIZE	NICD	Cell Size	Capacity	Size (Inches)		Dantona PT#		
			mAh	Dia	Hgt			
9V SIZE	NICD	9V	120	STANDARD 9V SIZE	9V-8.4NCD			
		Gold Peak is the manufacturer of packs with "GP" in the part number.						
		NIMH	NIMH	9V (9.6V)	170	STANDARD 9V SIZE	9V-9.6NMH-GP	
				9V (8.4V)	200	STANDARD 9V SIZE	9V-8.4NMH-GP	
9V (8.4V)	280			STANDARD 9V SIZE	9V-8.4NMH-280			

Dantona also stocks a full line of Sanyo and Panasonic Nicad and Nimh batteries.

Available cells and capacities may change without notice.

Call 1-800-Dantona (800-326-8662) for SAME DAY DELIVERY

BPP&T

Editor & Publisher
David Webster

Director of Content
Shannon Given

Associate Editors
Jeremy Martin, Nick Depperschmidt

Assistant Editors
Heather Krier, Joanna Larez

News Editors
Jeremy Fleming, Karen Poulson,
Jessi Albers, Sue Hannebrink,
Laura Mayo

Manager of Administration
Marsha Grillo

Advertising, Sales and Marketing

Jessi Albers, Director of Sales
Jeremy Fleming, Account Executive
Jennifer Graham, Marketing Assistant
Jessica Thebo, Marketing Manager
Julie Hammond, Production Manager

Director of Support Services
Marc Vang

Circulation
Andy Gurokovich

BATTERY POWER PRODUCTS & TECHNOLOGY (ISSN #1092-3616) is published bi-monthly by Webcom Communications Corp., 7355 E. Orchard, #100 Greenwood Village, CO 80111. Free for the qualified US \$58.00 non-qualified US and \$72.00 elsewhere.

Periodicals Postage paid at Englewood, CO and additional mailing offices.

POSTMASTER:

Send address changes to:
Webcom Communications
7355 E. Orchard, #100
Greenwood Village, CO 80111

Photocopy Rights: Permission to photocopy for internal or personal use, or the internal or personal use of specific clients is granted by *Battery Power Products & Technology* for users through Copyright Clearance Center, provided that the base fee of \$2.50 per copy of the article, plus \$1.00 per page is paid directly to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923 USA (978) 750-8400. For government and/or classroom use, the Copyright Clearance Center should be contacted. The rate for this use is 0.03 cents per page. Please specify ISSN #1092-3616 *Battery Power Products & Technology*.

Reprints: For reprint requests contact The YGS Group at 1808 Colonial Village Lane, Lancaster, Pa., 17601 USA (717) 399-1900.

© Copyright 2009 Webcom Communications Corp. Material in this publication may not be reproduced in any form without written permission. Requests for permission should be directed to the customer service manager.

Webcom Communications Corp.
7355 E. Orchard Rd., # 100
Greenwood Village, CO 80111
Phone 720-528-3770
Fax 720-528-3771
www.BatteryPowerOnline.com
Office hours:
7 a.m. to 5 p.m. MST

New Batteries on the Market

Long-Duration Front Terminal Batteries for Telecom Power Back-Up Applications

RPS Power Systems has expanded its line of valve regulated lead acid (VRLA) batteries by introducing the LDT12-190FT battery (12 V / 190 Ah front terminal), which through grid and plate optimization offers an increased capacity to 190 Ah in the same footprint as the 170 Ah and 180 Ah front-terminal batteries while providing Network Equipment Building Systems (NEBS) and Telcordia compliance.

The LDT12-190FT is optimized for long-duration (12-year design life) standby power requirements for telecommunication applications that include fixed wireline, wireless, PBX systems, microwave, mobile switching systems, broadband headend, fiber optic distribution, electric utility/switchgear, data centers and alternative energy.

As a complement to RPS' existing line of long-duration telecom batteries that offer ample coverage for most cabinet sizes and application demands, the LDT12-190FT is available in both modular, four-post and standard 19-inch and 23-inch rack power systems meeting NEBS and UBC Seismic Zone 4 requirements.

Additionally, the LDT12-190FT battery comes complete with carrying handles, features a three-part post-to-cover seal for ensuring operating service life integrity, copper alloy front terminals for ease of installation and maximum current-carrying capability and is designed and manufactured in compliance with NEBS, Telcordia GR, Telcordia SR, IEC, BS, UL, ISO and CE quality and performance standards.



Micro Power Introduces a Battery Pack with Cell Balancing

Micro Power Electronics has released its first lithium-ion battery pack with integrated cell balancing capabilities. For larger lithium-ion battery packs, cell balancing extends battery life and system runtime, as well as improves the inherent safety of the battery pack.

The battery pack consists of 27 18650 lithium-ion cells, arranged in a nine series, three parallel configuration. The battery pack provides a nominal 33 volts and has a 7.8 amp-hour capacity. The battery pack is used to power untethered undersea sensors that collect seismic data from the ocean floor. This data is used by the oil and gas exploration industry. Long runtime



and assured performance in the field are critical features of this battery pack.

The cell balancing technology moves energy dynamically from cell to cell with very high efficiency, and does not waste excess energy as heat during the energy transfer process. This ensures that a potentially weaker cell within a pack does not negatively affect the overall performance of the pack. The cell balancing occurs at every stage of battery operation; charging, discharging, quiescence and storage. For higher voltage battery packs, advantages of cell balancing include increased duty cycles throughout the pack life (i.e. longer life), maximizing available capacity and ensuring uniform heat generation by the battery pack.

EnerSys Adds 800 WPC Model to its DataSafe 16 Volt Front Terminal UPS Battery Line

EnerSys has added a new product to its DataSafe 16 V Front Terminal UPS Battery line: the 16HX800F-FR. The DataSafe 16HX800F-FR is a valve regulated lead acid (VRLA) battery that produces 800 WPC for 15 minutes to 1.67 volts per cell at 77°F.

DataSafe 16 V are VRLA batteries that provide more power than 12 V batteries and use less space. They are specially designed to back up the primary power system for UPS applications and supply power for 15 minutes until the backup generator is fully operational.

The DataSafe 16HX800F-FR can produce the necessary power to handle the runtime for large UPS systems without having to use smaller 12 V batteries that require more strings and therefore drives up the system cost. They have up to 50 percent fewer connections, which simplify wiring and helps reduce costs.

The high power rating of the 16 V batteries also give users a more economical and space efficient option to large single cell VRLA batteries in high power rated UPS systems.

EnerSys was the first to introduce a 16 V front terminal battery for UPS applications. With the addition of the DataSafe 16HX800F-FR, EnerSys offers the 16 V VRLA batteries in three sizes: 500 watts per cell (WPC), 800 WPC and 925 WPC. They require 44 sq. ft. to support a typical 750 kVA UPS system with a full 15 minutes of runtime.

With the same dimensions (27.2 inches by 7.0 inches) and 20 lbs. lighter (220 lbs.), the DataSafe 16HX800F-FR fits in the same rack system as the 925 DataSafe 16 V batteries. Cabinets are available in gray or black to match other data center equipment. Complete front access in the 16 V front-terminated DataSafe models makes access and maintenance easier than top-terminated 12 V batteries.



A First Look at the mPhase Smart NanoBattery

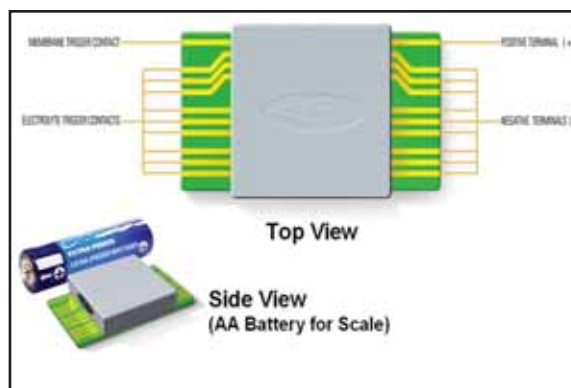
mPhase Technologies, Inc. has released the first image of the Smart NanoBattery packaging prototype. The Smart NanoBattery is being developed as part of the US Army STTR Program. mPhase was awarded a two year Phase II development contract in September 2008 to complete the battery.

The image showcases the packaging for the multiple cell design that will potentially provide constant power to certain devices for 20 years. An AA battery is shown to provide an accurate scale relating to the size of the Smart NanoBattery. Internally, the Smart NanoBattery has several layers including the silicon based membrane that is the battery's critical element. By keeping key chemicals separated until initial use, the membrane provides a shelf

life of at least 20 years.

The Smart NanoBattery is both smart and programmable in that it can be programmed to activate according to a predetermined schedule, sequence or external trigger. As the power drains from each cell, the NanoBattery is designed to automatically activate the next cell. This automatic progression may eliminate the need to service certain devices, such as wireless sensors, as often as is currently needed.

"It's really great to see this project coming together in a tangible form," said mPhase CEO Ron Durando. "With each step forward we are making accomplishments that have never been seen before in the nanotechnology community."





AnalogicTech's Current-Limited Load Switch Simplifies Hot Swap Management

Advanced Analogic Technologies, Inc. (AnalogicTech) has released the AAT4614, a new current-limited P-channel MOSFET power switch for high side load switching applications. Designed to protect peripheral ports from short-circuit and over-voltage events, the new load switch combines reverse current blocking with programmable current limit capability and an integrated fault flag in a silicon footprint up to 30 percent smaller than traditional implementations.

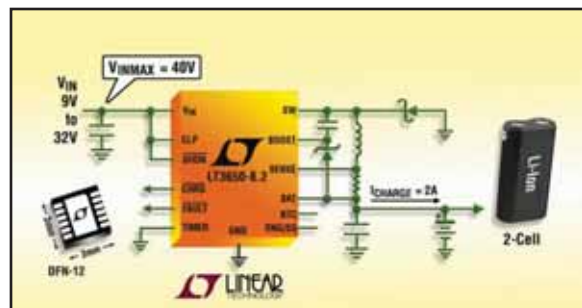
Operating across an input range of 2.4 V to 5.5 V, the AAT4614 can be used in both 3 V and 5 V systems. When the input drops below 2.4 V, an under-voltage lockout circuit automatically shuts down operation to avoid saturation.

To protect the device against large input currents that could cause the supply to fall out of regulation, this new load switch features an over current threshold, which is programmable up to 1.6 A via a resistor from SET to ground. A 1 μ s current limit transient response reduces the requirements for local supply bypassing.

The AAT4614 adds a reverse current blocking capability to protect the device from reverse current potentials when disabled. In addition, the device features an open drain FAULT flag to indicate an over-current or over-temperature condition. A 4 ms blanking time prevents false reporting during charge of a capacitive load.

To conserve power, quiescent current on the AAT4614 is 10 μ A. In shutdown mode, supply current decreases to < 1 μ A. The new switch also features an over-temperature protection circuit that automatically switches the device off if die temperature exceeds a pre-defined limit.

Qualified over a -40°C to 85°C temperature range, the AAT4614 is available in a Pb-free 8-pin SC70JW, a 6-pin SOT23 or a 5-pin SOT23 package. It sells for \$0.49 in 1,000 quantities.



Monolithic Two-Cell Li-Ion/Polymer Battery Charger Delivers Up to 2 Amps In Compact Package

Linear Technology Corp. has introduced the LT3650-8.2, a compact, monolithic high-voltage battery charger for two-cell Li-Ion/Polymer batteries. The device's switch-mode architecture minimizes power dissipation without compromising board space. The LT3650-8.2 accepts inputs up to 32 V and has a 40 V absolute maximum rating for added system margin. User-selectable timer or C/10 termination requires no external micro-

controller and simplifies the design. Charge current is programmable and dynamically adjustable up to 2 A; the power device is integrated on chip to save board space. The LT3650-8.2 does not require external high-precision resistors to set the float voltage, further saving cost and space. Applications include industrial handheld instruments, 12 V to 24 V automotive and heavy equipment, desktop cradle chargers and small notebook or tablet computers.

The LT3650-8.2's high operating frequency of 1 MHz and current mode architecture allow the use of small inductors and capacitors, minimizing noise and filtering needs. Final float voltage accuracy is specified at ± 0.5 percent, charge current accuracy is ± 5 percent and C/10 detection accuracy is ± 2.5 percent. Once charging is terminated, the LT3650-8.2 automatically enters a low current standby mode that reduces the input supply current to 85 μ A. In shutdown, the input bias current is reduced to 15 μ A. The LT3650-8.2 maximizes battery life during all non-charging periods, draining less than 1 μ A from the battery. For safety and autonomous charge control, the LT3650-8.2 includes features such as automatic restart and preconditioning, a thermistor input for temperature-qualified charging, programmable input current limit, bad battery detection and binary coded status output pins.

The LT3650-8.2 is available in a compact, low-profile (0.75 mm) 12-pin 3 mm by 3 mm DFN package, and is offered in both E and I grade versions, both operating from -40°C to 85°C. Pricing starts at \$2.80 and \$3.22 each, respectively, in 1,000-piece quantities.



Summit Introduces Programmable 500 mA Battery Charger

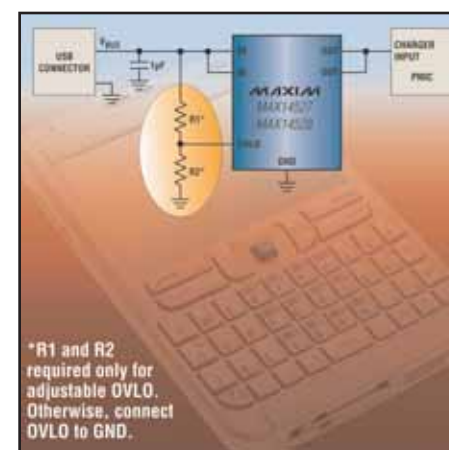
Summit Microelectronics has introduced a new addition to its family of programmable battery charger integrated circuits (IC) for single-cell Li-Ion and Li-Polymer powered systems. The SMB239 is a small charger IC and solution, enabling slimmer industrial designs for portable consumer electronics. The device's battery charging parameters are fully programmable via the I2C interface and non-volatile memory, allowing easy system design, without any hardware changes. Additionally, a class-leading set of safety features are incorporated, offering high system reliability and protection and eliminating the need for expensive, external safety components.

The SMB239 comprises a highly integrated, 500 mA linear charging solution that utilizes a fully programmable algorithm for single-cell Li-Ion and Li-Polymer cells. All charging parameters, pre-charge/fast-charge/charge termination current, cell float/pre-charge voltage, battery temperature/timer safety limits, are configurable via the I2C/SMBus interface, enabling a wide variety of algorithms without hardware changes. Default (custom) configuration in non-volatile memory allows the same product to be used in different system designs and/or with different battery types and technologies, resulting in significantly lower qualification/inventory costs and sourcing risks. Host/software control capability allows in-system adjustment of the charging profile, minimizing charging time and enhancing safety.

The SMB239 is offered in a 2.1 mm by 1.3 mm

CSP package and requires two small external chip capacitors for a complete battery charging system design. Unlike other linear chargers offered in packages with a limited number of pins, most of which need to be used for hardware-based programming, the SMB239's chip-scale package allows the integration of a higher number of features including critical charging protection functionality. Furthermore, the device eliminates the need for multiple external components necessary for setting charging parameters, thereby reducing system cost and size.

The SMB239 operates with an input range from 4.35 V to 6.5 V input and safely withstands continuous input over-voltage up to 10 V (non-operating), while protecting downstream circuitry. Ensuring long battery life when not connected to a DC power source, the device's reverse leakage current is less than 2 mA. The SMB239 is offered in a 2.1 mm by 1.3 mm, 8-ball, lead-free chip-scale (CSP) package (0.5 mm ball pitch) with an operating temperature range of -30°C to 85°C. Available now in production quantities, the SMB239 is priced at \$0.81 each in quantities of 10,000 units.



Adjustable Overvoltage Protectors Deliver Input Voltage Protection and Maximum Flexibility

Maxim Integrated Products has introduced the MAX14527/MAX14528 overvoltage protectors (OVPs) designed to protect low-voltage systems against voltage faults up to 28 V. These devices employ an internal low, 100 milliohm (typ) Ron MOSFET to prevent damage to circuitry from over-voltage conditions. This integration eliminates the need for an external n-channel MOSFET, thus saving board space and reducing cost. Additionally, the devices enhance design flexibility by allowing designers to adjust the overvoltage-protection threshold with optional external resistors to any voltage between 4 V and 12 V. The MAX14527/MAX14528 are well suited for cell phones, media players, PDAs and other portable applications requiring accurate overvoltage protection.

These OVPs integrate thermal shutdown protection to prevent overcurrent damage, and they provide ± 15 kV ESD protection (human body model) when the input is bypassed with a 1 microfarad capacitor to ground. Packaged in a lead-free, 2 mm by 2 mm, 8-pin TDFN, the MAX14527/MAX14528 are fully specified over the -40°C to 85°C extended temperature range. Prices start at \$0.90 (1,000-up, FOB USA).

Are you an A, B or C?
Your subscription to Battery Power magazine may be about to expire. Check your status in the colored box located in the mailing label on the front cover.

Subscribe online at
www.BatteryPowerOnline.com.

Integrated Circuits & Semiconductors

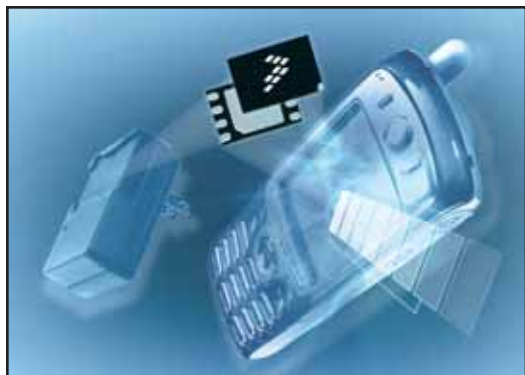
TI Introduces Impedance Track Battery Fuel Gauge for Handheld Electronics

Texas Instruments, Inc. (TI) has introduced a single-cell battery fuel gauge integrated circuit (IC) with Impedance Track technology, which is half the size of its predecessor. The bq27505 stand-alone lithium battery capacity monitoring and reporting device resides in the system and measures 2.5 mm by 2 mm by 0.625 mm, and supports portable applications, such as smart phones, digital cameras and MP3 players, where maintaining long battery life is critical for end users.



TI has also introduced the bq27541, which resides within a battery pack or on the system's main board in an embedded, non-removable battery. The device also provides secure battery pack authentication, using the SHA-1/HMAC authentication algorithm.

Impedance Track technology accurately predicts battery capacity instantly under all operating conditions including battery age, temperature and discharge behavior.



Freescale Introduces Accurate Li-Ion Battery Charger Integrated Circuits

While lithium-ion (Li-Ion) batteries offer many advantages for portable consumer electronics, they require extremely accurate charging current and output voltages to optimize battery life and performance. To address this need, Freescale Semiconductor has introduced a family of Li-Ion battery charger ICs designed to provide the industry's highest performance and accuracy, as well as enhanced configuration flexibility.

Freescale's MC34671, MC34673 and MC34674 single-input autonomous battery charger ICs offer output voltage accuracy of +/-0.4 percent over temperature and charging current accuracy of +/-5 percent over temperature. The ICs can be customized to create hundreds of configurations to address a wide range of portable and ultramobile device needs. A designer can select features and specifications, such as pin-out, feature set, charging parameters and LED indication, and Freescale can deliver customized charger ICs by programming them at the end of the manufacturing process.

The programming flexibility of the Li-Ion battery charger devices enables Freescale to create highly tailored charger ICs for specific application requirements. Target applications for Freescale's battery charger IC family include cell phones, personal media players, navigation systems, digital still cameras, as

well as travel chargers for these devices.

Built using Freescale's SMARTMOS process technology, the battery charger ICs are designed to deliver up to 1.2 A of charge current to single cell Li-Ion or Li-Polymer batteries. The battery charger input voltage can come from an AC adapter or a USB port power source. The high input voltage capability (up to 28 V) is designed to eliminate the need for an external input over-voltage protection circuit required in handheld devices, which helps reduce system cost and board space.

To provide developers with smaller, lighter charger IC products for space-constrained portable designs, each battery charger IC comes in a low-profile 2 mm by 3 mm by 0.65 mm dual flat no-lead (UDFN) thermally-enhanced package.

Introducing a New Product?

Send Your New Product Announcements to Shannon Given, Director of Content, at ShannonG@infowebcom.com

**PRED
MATERIALS**
INTERNATIONAL, INC.

www.predmaterials.com

Top quality battery materials & equipment for lab & factory

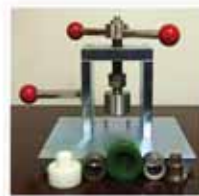


When everything depends on quality:
Specialty battery materials for the Mars Lander and Rover were supplied by Pred Materials.

Illustration: Courtesy NASA/JPL-Caltech

Pred Materials supplies battery materials and equipment for labs and full scale production. Our battery product line offers lab scientists and production teams the quality and technology they need for demanding applications. Some examples:

Manual Coin Crimpers • Cylindrical Can Crimpers • Electrode Powders
Coin Cell Disassemblers • Semi-Automatic Winders • Metal Foils
Manual Punches • Electrolyte Filling Machines • Aluminum Laminate Packaging



For the lab: Manual Crimper, Coin Cell Disassembler

For the factory: Forming Machine, Sealing Machine

Hohsen

Hohsen Corp. of Japan and Pred Materials, its exclusive North American distributor, are proud to offer large-scale battery manufacturing equipment made by Hi-Mecha and other top quality producers, in addition to Hohsen's comprehensive line of battery lab tools and components.

T - 212.286.0068
F - 212.286.0072

Pred Materials International, Inc.
60 East 42nd Street, Suite 1456
New York, New York 10165

steve@predmaterials.com
www.predmaterials.com



Ultra Slim DIN Rail AC/DC Power Supply Series Offers Up To 92 Percent Efficiency

XP Power has released the availability of its DRS series of DIN rail mounted AC/DC power supplies. The series, comprising 80, 120 and 240 watt single output models, offer efficiency levels of 89 to 92 percent. Believed to be one of the slimmest DIN rail power supplies available on the market, each model of the DRS series is extremely thin. The 80 watt DRS80 model measures 1.26 by 4.0 by 4.88 inches (32 by 102 by 124 mm), and the 240 watt DRS240 model measures 2.36 by 4.60 by 4.88 inches (60 by 113 by 124 mm). The compact nature of the DRS series yields above average power density for DIN rail units of up to 4.5 watts per cubic inch.

The DRS series accommodates the universal input range of 85 VAC to 264 VAC without the need for any input range selectors. This makes the series suitable for a wide variety of high line and low line applications.

The series provides the output voltage variants of 12, 24 or 48 VDC. The outputs are capable of being adjusted above the nominal voltages. The 12 VDC output can be increased up to 15 VDC, the 24 VDC to 28.5 VDC and the 48 VDC up to 56 VDC. Being able to provide such a wide range of output voltage adjustment allows customers to deploy the same power supply in a variety of different configurations. All models can accommodate a peak load 150 percent of nominal rating for up to a maximum of four seconds. This suits applications that need a high startup current or those where short peaks are anticipated. In this way, a lower power rated and less expensive power supply can be specified instead of a higher rated unit. The 120 watt and 240 watt models have a DC OK volt free contact as standard.

Capable of operating over a wide range of temperatures from -20°C, the DRS80 and DRS120 can provide full power output up to 60°C. The DRS240 operates without derating to 50°C. All units operate above these temperatures with derating to 70°C.

The DRS series is fully approved to worldwide industrial and commercial safety. Available now and priced at \$74.10 for the DRS80 to \$155.22 for the DRS240 in OEM quantities.

New Minuteman Extreme Runtime Battery Packs Extend Business-Critical Continuity During Power Outages

Offering companies up to a five time increase in battery runtime for their uninterruptible power supplies (UPS), Para Systems, manufacturer of the comprehensive line of Minuteman power protection solutions, has released the availability of its EXL series of extreme runtime battery packs for mission critical applications. The new products are compatible with Minuteman's Endeavor online and EnterprisePlus line interactive UPS solutions for enterprise IT, security and voice over IP (VoIP) phone systems.

IT managers at small and medium-sized businesses (SMBs) are seeking longer battery back-up times for servers, networking devices,

data storage, telephone and security systems according to a Frost & Sullivan survey. "Having a longer time to react when power outages occur has moved from a luxury to a requirement as IT managers handle an increasing number of mission-critical systems and applications," said Vishal Sapru, energy and power industry analyst for Frost and Sullivan. "SMBs continue to tell us that they want UPS solutions that offer more battery backup time."

"When the power fails, businesses are in a vulnerable position that can have a widespread effect across every operational function," said Bill Allen, director of marketing for Para Systems. "When power fails, the phone system goes down and the life-line to customers is cut off. When networks go down, companies cannot perform vital operational functions. If a security system goes down, there is no security. The more reliant businesses become on these systems, the more important it is to keep them up and running during an extended power outage."

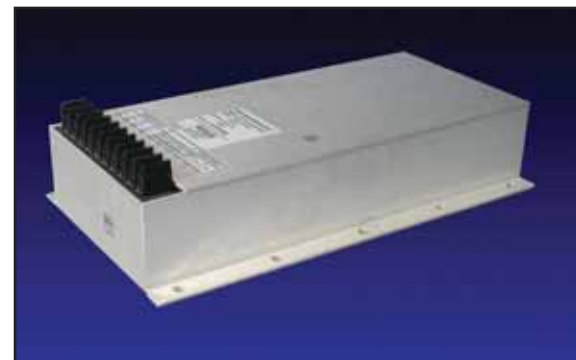
AMREL Introduces the MFP300 Military Grade Fixed Power Supply

AMREL/American Reliance has introduced the new ePower MFP300 Military-Grade Fixed Power Supply. Continuing to innovate and diversify their technological capabilities in a customer-centric tradition, AMREL developed the MFP300 to address a ground based military application requiring an ultra-compact, powerful, clean and MIL-STD rugged 28 VDC/300 W DC power supply. AMREL engineered a blueprint to overcome three major technical limitations of existing solutions; convection-cooled with power dissipating components in an ultra-compact MIL-STD Rugged package, 440 Hz PFC input while meeting MIL-STD 461E EMI/RFI standards and a precision-regulated DC output with less than 2 mVrms of noise.

AMREL's Military-grade MFP300 effectively powers DC devices in the harshest outdoor conditions. In a concentrated effort to deliver a versatile and reliable power source for military field applications, AMREL pushes the power envelope to enclose 300 W in a 12 inch by 7.6 inch by 3.5 inch package, 300 watts enclosed in 320 in³ of anodized hardware weighing just over 8 lbs. Without sacrificing performance, the conformal coated internal DC power engine is enclosed in a rain, dust, sleet and sand resistant package, sealed watertight and then extensively tested under temperature cycles from -40°C to 70°C. This ensures quality performance even under severe ambient operating conditions. Electrically speaking, the MFP300 utilizes an innovative interleaved PFC design that takes auto-ranging 85 to 250 VAC and 5 to 440 Hz AC input and also can run off of 95 to 250 VDC. The DC-operable input and 440 Hz operating frequency are unique features exclusive to AMREL's MFP series. For applications with a 400 Hz AC generator or a DC power source, simply plug in AMREL's MFP300, and users can power devices on aerial or ground vehicle with an adjustable DC voltage from 24 to 28 VDC at 300 W. The MFP300 generates a precision-regulated DC output with a ripple of 2mVrms, providing a source for noise-sensitive devices.

Encapsulated DC/DC Converter Delivers 500 Watt in Extreme Environments

Absopulse Electronics' PDC 500 is a recent addition to its line of rugged DC/DC converters. This unit is encapsulated in a thermally conductive MIL-specification silicon rubber compound for immunity to shock, vibration and moisture, and is suitable for operation in transportation, oil and gas, mining, industrial automation, utility and other extreme environments. It operates in a -40°C to 60°C cold plate temperature range, with extended temperature ranges available on request. The PDC 500 is designed to meet IEC 61373 Categories 1 A & B



shock and vibration standards. Absopulse also offers a 500 W, encapsulated converter that complies with EN 50155 for electronic equipment used on railway rolling stock.

This 500 W converter utilizes field-proven push-pull topology to deliver 12 V, 24 V, 48 V or 110 VDC and it operates from 24 V, 48 V or 125 VDC supply voltages. At 125 VDC input, the unit can provide up to 600 W output power. Other input and output options are available on request.

The PDC 500 is filtered to meet EN 55022 Class A EMI with wide margins. It is also designed to meet EN 60950 and related standards. The unit features inrush current limiting and surge and reverse polarity protection on the input. Output protection includes current limiting with short-circuit protection and thermal shutdown with self-resetting. Combined line and load regulation are ± 1 percent from no load to full load and efficiency is a minimum of 82 percent. The PDC 500 is priced at \$300 at quantities of 100.

VOLTpoint™ Li-Ion Cell Measurement.



VOLTpoint™ is a precision high-voltage measurement instrument for measuring a wide range of voltage inputs; ideally suited for lithium-ion cell-by-cell battery testing from millivolts to $\pm 100V$.

VOLTpoint instruments have floating front ends with each input connected to an individual, floating A/D converter with signal conditioning.

Applications

- High voltage data acquisition
- Hybrid-Electric Vehicle (HEV) battery performance
- Li-ion Cell Measurement
- High voltage, precision battery stack, or cell balance measurements



DATA TRANSLATION
www.datatranslation.com

Charging & Testing

Philadelphia Scientific Introduces TwinCharge Battery Charger Sequencer

Philadelphia Scientific has introduced TwinCharge, a battery charger sequencer that allows two industrial batteries to be charged sequentially from the same charger. TwinCharge enables warehouses and distribution centers to maximize battery charging capability, particularly when battery room charger slots are limited. This is often a problem, for example, when rental trucks are being used or a facility is being expanded. The new battery charger sequencer also provides significant savings for companies that may be considering the purchase of SCR or high frequency chargers, as the addition of a TwinCharge sequencer may be more cost effective than the purchase of a second SCR or high frequency charger.

When two batteries are plugged into TwinCharge's two output cables, one battery automatically starts to charge. When the charge is completed, the first battery is safely isolated from the charger, preventing potential sparks during disconnection. The TwinCharge sequencer then automatically switches over and begins charging the second battery without operator input. The status of each battery is clearly displayed on the control panel as "connected," "charging" or "ready." The TwinCharge sequencer is powered from the battery that is being charged, so no additional A/C lines are required to power it.

The TwinCharge sequencer is also compliant with the Philadelphia Scientific Intelligent Battery Organizing System (iBOS) and comes ready to be connected to an iBOS system if desired. The sequencer can be connected to an existing or newly installed iBOS system so that each battery is individually monitored and will be dispatched in the order that its charge is completed.

Automotive Battery Chargers, Battery Maintainers and Battery Testers

Granite Digital has introduced its new line of Save A Battery 12 volt chargers, maintainers and testers. Designed to support all lead acid, AGM and Gel Cell batteries, they not only charge and maintain automotive type batteries but they also test, monitor, audible alarm, rejuvenate, condition, power cycle and diagnose electrical and charging systems. The built-in digital LCD display works as a voltmeter to pinpoint most electrical and charging system problems.

The Modular Cable System (supplied with all models) offers versatile connection styles including battery terminal, battery clip-on and cigarette lighter connections in both short or long cable lengths. Gold contacts are used to provide better conductivity in harsh garage and shop environments. All cable ends have a simple attaching loop that makes it easy to permanently fasten them to just about anything and moisture covers to keep the contacts clean.

A unique mounting system allows the chargers, maintainers and testers to be mounted on a wall or in a vehicle. The units can be removed and used remotely and then slipped back on the mounting bracket for long-term monitoring and maintaining.

ECotality's eTec Launches New Minit-Charger FC Fast-Charger

Electric Transportation Engineering Corp. (eTec), a wholly owned subsidiary of ECotality, Inc., has launched the new Minit-Charger FC battery fast-charging system. The FC is specifically designed for heavy-duty material handling appli-



cations and reduces a facility's electrical consumption by featuring the highest energy conversion efficiency (97 percent) and power factor amongst chargers in its class. Utilizing Minit-Charger's patented advanced algorithm technology, the Minit-Charger FC system is 50 percent to 65 percent smaller and 50 percent to 70 percent lighter than other fast-charge systems that provide a power output of up to 320 amps.

The Minit-Charger FC is a UL certified, high-frequency, single-connector charger designed for heavy-duty applications. Providing up to 320 amps of output, the FC Charger can fast-charge battery systems of 48 volts (or less) more than four times faster than conventional chargers. The FC Charger features a light and compact design that allows the system to be pole or wall mounted in order to save valuable floor space. The FC Charger also features the patented Minit-Trak data management system that provides the most comprehensive performance evaluation of a battery's state-of-health and state-of-charge and the Battery Data Control (BDC) system that automatically adjusts charging rates to increase and maximize battery life.

Advertorial

Discourse on Dynamic Pulse Formation Process

What is Dynamic Pulse battery formation technology?

Dynamic Pulse battery formation technology developed by Applied Electronics Labs Ltd is characterized by fast charging impulses alternated by discharging impulses with variable impulse and pause durations from 3ms.

What are the benefits of using Dynamic Pulse Technology?

Three main benefits of Dynamic Pulse technology determined for now are significantly shortened formation time, lower formation temperature and less gassing comparing to ordinary manufacturing methods.

Can you give the example of pulse formation effects in real life?

Tests of formation with Dynamic Pulse introduction were conducted on 55Ah starter batteries from three manufacturers with major differences in their current production processes. The results were consistently positive: using Dynamic Pulse formation process, battery formation time was reduced from 42 to 10 hours, from 28 to 10 hours, and from 14 to 7 hours respectively. To put it simply - it means one will need on average about two times less formation equipment with Dynamic Pulse formation, than with popular formation process.

At the same time considerable Energy savings were determined during Dynamic Pulse formation, e.g., where formation time was cut from 14 to 7 hours, the pulse formation process saved more than 20% of energy.

The most important side effect, however, was increase of initial battery capacity with Dynamic Pulse formation - in fact, none of the batteries formed with Dynamic Pulse had lower initial battery capacity than the reference battery formed with standard formation methods, but some had increase even up to 5%!

What is the average charging current in Dynamic Pulse formation?

To achieve such fast formation time one need to apply much higher current than using standard formation process. Referring to our tests of three manufacturers batteries, average formation current for Dynamic Pulse programs was 22A compared to 3.5A using CC, 35A compared to 3A CC and 29A instead of 19A CC formation. That's why our smallest formation rectifier is 100 amps.

What about formation temperatures?

Formation temperatures were strictly controlled and they were in range accepted for production - maximum value was about 60°C for all manufactures.

Although Dynamic Pulse formation current exceeds standard CC formation current up to 7 times, average voltage during Dynamic Pulse was retained below that of CC formation. For example, 16.5V arose during formation with 5A Constant Current and 15.7V were maintained during Dynamic Pulse formation with 37A.

Does batteries formed with Dynamic Pulse technology meet performance tests requirements?

Yes, of course! They were done by battery manufacturers and capacity (C20 test) of 55Ah battery was determined 56.8 Ah. Battery performance during cold cranking test gained 7.9 Sec and 158 sec.

Dynamic Pulse formation rectifier FORMAC FS2

FORMAC FS rectifiers using cutting edge electronic technologies are state of the art formation equipment designed to achieve speed and precision values usually associated with IGBT switches and at the same time providing operational stability, security and price of SRC technology.

The technical features: minimal impulse duration 3ms, minimal pulse period 10ms (@100Hz), min charge/discharge switch time <3ms, all pulse parameters are adjustable, current accuracy +/-0.1% of f.s., operating modes - pulse, CC/CV, combined.

Management software features: 2200 unique steps per each program, data recording >30 parameters each second. Remote command and local operation after formation program download. In case of interruption, formation program will continue from the stop-point.

Safety means: IGBT switches (1 sec), units in cabinet are galvanic isolated, circuit breakers with remote control. Power transformers soft-start. System maintains operational stability with less battery than for designed voltage required.



For further information visit www.batteryformation.com or www.ael.lv.

ECC Releases State of the Art Solar Controller Model 510

Electronic Control Concepts has introduced the first product in its new line of alternative energy solutions.



The Solar Controller, Model 510, features ECC's own intelligent charge regulator designed to maximize efficiency and minimize the cost of implementing many solar solutions. The unit is proven to extend battery life by automatically preventing both overcharge and deep discharge. The Model 510 is a user-friendly, flexible solar controller that makes it easy

to implement a wide variety of solar applications that use photovoltaic panels, batteries and a DC output or load. Applications include emergency power, DC lighting, pond aerator, water pumps, garden fountains, running a DC motor and more.

In many applications, all that is necessary is to connect the recommended battery to the Model 510, hook up an appropriate solar panel, connect the DC load and configure the Model 510 switches for a particular application. The Model 510 unites the battery, solar panel and DC load so that they operate together seamlessly.

Each unit is fully customizable to meet the clients' needs with several user-selected operating modes including duty cycle, deep cycle and night mode. There are four photovoltaic / battery configurations (12, 24, 36, and 48 volt systems are available).

The Model 510 makes it easy to integrate photovoltaic panels, a battery and a DC load into an operational system without the need to understand complex technical specifications.

recycled 210,000 pounds of lead in 2008 that was extracted from our wastewater."

"We are extremely proud of our Richmond, Ky. plant. They consistently rank among the best in class manufacturing facilities in the world and their wastewater pretreatment achievement will set the standard for other manufacturers." stated John Shea, executive vice president, Americas.

EnerSys has a long standing commitment to minimizing their impact on the environment. "We are continually assessing our products and processes in order to reduce our environmental footprint." said Randy Reyer, director, Environmental, Health and Safety. "We lead our industry in protecting the health and safety of our employees and the local communities in which we operate." In addition, EnerSys offers a world wide recycling program to industrial battery customers to ensure that batteries are disposed of in an environmentally safe manner.

EnerSys Wins Industrial Wastewater Pretreatment Award

EnerSys was awarded the Industrial Pretreatment Award by the Kentucky-Tennessee Water Environment Association based in Nashville, Tenn. The Industrial Pretreatment Award is awarded for outstanding performance in the pretreatment of industrial wastewater. The EnerSys manufacturing plant in Richmond, Ky. was nominated for the award.

"The city of Richmond significantly cut our wastewater discharge limits in 2006. We immediately began researching state-of-the-art water treatment systems because our existing system was not capable of meeting the new discharge requirements." explained Dennis Brumbaugh, EnerSys Richmond Plant Manager. EnerSys selected a membrane filtration system which is used widely in chemical and biotechnology processes as well as for cleaning industrial process wastewater.

"We are currently processing 30,000 to 50,000 gallons of water per day through our filtration system," said James Pikul, EnerSys Richmond Plant Environmental, Health and Safety manager. "Our new wastewater treatment method is a closed loop system. This means that the waste byproducts are reintroduced back into our manufacturing process. We now recycle 80 percent of our waste sulfuric acid. We also

Responsible Energy Corp Re-Charges With Green Batteries to Benefit The Environment

When it comes to batteries, many consumers are in the habit of buying cheaper batteries and throwing them away once the battery's strength is gone. Responsible Energy Corp. aims to educate consumers about how using throw-away batteries negatively affects the environment. The company gears its energy toward marketing rechargeable batteries for all common uses, or green batteries that can be used again and again.

Responsible Energy Corp. realizes that even consumers who buy rechargeable batteries will often buy these only for the products that require them: digital cameras, games, portable music players, GPS and other electronics that normally drain the life from a battery quickly. The company is promoting the use of rechargeable batteries, no matter what type of product or how efficiently the product uses a battery's energy.

With more than 15 billion batteries being produced and sold worldwide annually, the company believes its efforts are not in vain.

"Many of the batteries being sold are alkaline batteries. These are discarded after a single use. We want to change that by encouraging folks to spend just a little more now on rechargeable batteries to save hundreds of dollars later, while simultaneously contributing to a greener planet," said Curtis Randolph, owner of

The Environmentally Friendly Rechargeable Battery

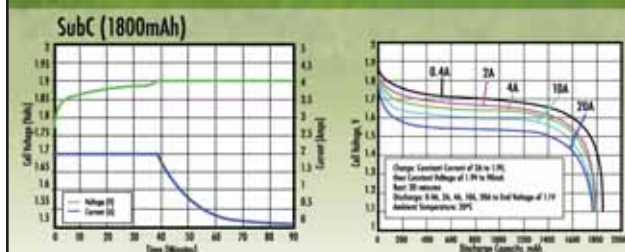
NiZn: an Alternative to NiMH & Li-Ion

PowerGenix has developed the only 100% safe, environmentally friendly battery that's non-toxic, non-combustible and the most recyclable in the industry. NiZn batteries also outperform Nickel Metal Hydride and Nickel Cadmium, boasting size and weight decreases and a 30% increase in power density. Plus, NiZn costs less and is a safe alternative power source to Li-Ion.

www.PowerGenix.com



NiZn
RECHARGEABLE



POWERGENIX

www.PowerGenix.com (858) 547-7300
info@powergenix.com

WhiteWave Foods Enlists PosiCharge/Toyota Material Handling, U.S.A. Team to Unveil Updated Environmentally Friendly Distribution Center

WhiteWave Foods Company has unveiled its updated, environmentally friendly distribution center that now features increased productivity and reduced energy solutions from AeroVironment, Inc.'s (AV) alliance with Toyota Material Handling, U.S.A. (TMHU). AV and TMHU formed the alliance last year to offer a wide range of PosiCharge product solutions to reduce energy consumption and operating costs for their material handling customers.

WhiteWave Foods enlisted TMHU and AV to eliminate the time and space consuming conventional battery changing equipment that had been occupying 1,500 square-feet in its facility. The distribution center now operates new state-of-the-art electric Toyota lift trucks supported by AV's intelligent fast charging technology.

"By combining the leading AC motor technology with the leading fast charge technology, WhiteWave Foods now has a streamlined, efficient and more sustainable operation," Mike Bissonette, senior vice president and general manager, AV Efficient Energy Systems, and Brett Wood, president of Toyota Material Handling, U.S.A., Inc. said in a joint statement. "Today's environmental concerns, along with initiatives to improve efficiency and increase productivity, make the alliance between Toyota and AV the perfect fit for companies like WhiteWave Foods."

"We are committed to making the environment in which our employees work safer and more efficient, and this distribution center is an example of our company's commitment to responsible, sustainable business practices," said James Ramsey, Logistics Manager-COI North, WhiteWave Foods. "The Toyota-AV alliance provided an excellent one-stop solution to achieve better productivity in a cleaner environment for our workforce and community, while maximizing the life of our equipment." Ramsey noted that the possibility of lead acid spillage has been reduced and that fewer batteries will be heading to local landfills because of the extended life cycle of the new batteries and the company's reduced battery inventory.

The distribution center now features 28 Toyota lift trucks and 25 PosiCharge intelligent fast chargers that have streamlined operations and eliminated the need for more than 28 conventional batteries formerly used for battery changing. PosiCharge systems are completely automated, hands-free fast chargers that require minimal training for electric industrial vehicle drivers. There are no settings to learn and no buttons to push, so training can be accomplished in minutes.

Responsible Energy Corp.

One idea the company wants to get across is consumers can save money by switching to Nickel Metal Hydride (NiMH) batteries. Whether users need AA or AAA batteries, they can easily and affordably replace them with these to enjoy a much longer battery life. Lithium Ion (li-ion) batteries are not normally available in consumer sizes and voltages but there are some exceptions.

Honda Recognizes Environmentally Responsible Battery Chargers

Alten Battery Chargers, Inc. has been recognized as an OEM partner with Honda, Inc., as it introduces the first full line of portable DC battery chargers to the North American market. Powered by Honda's environmentally responsible, advanced four-stroke engines, Alten's portable battery chargers can save up to four hours (67 percent) of time and offer up to 67 percent savings in fuel over conventional battery charging methods.

With more than 10,000 battery chargers sold around the world, North America now has the opportunity to experience the quickest way to bulk charge batteries.

Originally designed for the rugged Australian Outback, by Christie Engineering, Alten's portable battery chargers are used in applications including mountain-top communication stations, charging batteries in unmanned lighthouses on the Norwegian coastline, and servicing heavy industrial equipment with the roughest abuse imaginable.

Unlike an AC generator paired with a slow plug-in charger, Alten Battery Chargers are a fast and highly efficient way of charging 12, 24 and 48-volt battery configurations. They can deliver up to 120 amps per hour of run time consuming 0.4 gallons of fuel to achieve a 90 percent bulk charge on a 500 amp/hour bank of batteries in two hours. Compared to a 3,500 W AC generator, running at full throttle, paired with a 40 amp plug-in charger, this same charging scenario would take six hours and consume 1.2 gallons of fuel. As a result Alten's portable battery chargers save fuel, save time, lower emissions and increase reliability.



S&C installs Smart Grid Storage Management System for Xcel Energy Wind-to-Battery Project

Integrating variable wind and solar power production with the needs of the power grid is an ongoing issue for the utility industry. Xcel Energy has begun testing battery-storage technology that captures wind energy and moves it to the electricity grid when needed. This is the first US application of the battery as a direct wind energy storage device.

S&C Electric Company was contracted to install the battery along with the S&C Smart Grid Storage Management System (SMS). The SMS is a fast-response automatic controller that interfaces between the stored energy system and the utility,

providing the ability to store energy in a battery storage system, and to control the discharge of power when required. It can address such issues as intermittent power production with production peaks and valleys, VAR control on generation, SCADA control of wind production and improved integration of wind generation into the standard generation production schedule. For example, SMS can store wind power during periods of high output. The stored power can then be used for a variety of purposes, including peak shaving, establishing a distributed power grid during a general outage, energy arbitrage or power quality improvement.

The 20 to 50 kW battery modules will be roughly the size of two semi trailers and weigh approximately 80 tons. They will be able to store about 7.2 MWh of electricity, with a charge/discharge capacity of one megawatt. When fully charged, the sodium-sulfur battery will potentially power 500 homes for over seven

hours. When the wind blows, the batteries are charged. When the wind calms down, the batteries supplement the power flow.

The project is located in Beaver Creek, Minn., about 30 miles east of Sioux Falls, S.D. The battery installation is adjacent and connected to a nearby 11-MW wind farm owned by Minwind Energy, LLC.

Nuvera Fuel Cells Introduces a New Hybrid Fuel Cell Product for the Material Handling Industry

Nuvera Fuel Cells has introduced a new line of cutting edge hybrid fuel cell products for forklift trucks called PowerEdge. PowerEdge replaces standard lead acid batteries and consists of Nuvera's PowerFlow hydrogen fuel cell system, sealed maintenance-free batteries, compressed hydrogen storage and a computerized



"I first used Trojan batteries as an end user and stayed with them when I started my own solar business. I install Trojan batteries because they are durable and easy to maintain."

~ David Verner, Adirondack Solar

New T105-RE Provides Longer Life

As part of Trojan Battery's RE Series, the **NEW T105-RE** battery has been optimized to deliver superior performance in renewable energy (RE) applications such as solar/photovoltaic, small wind and micro hydro.

Trojan Battery is the most trusted name in deep cycle technology and our T105-RE delivers:

- Even longer life
- Superior charge performance
- 5 year limited warranty: Best-in-class for Renewable Energy applications

Lab tested for reliability and performance, the T105-RE simply outperforms the rest. Experience the difference with the new T105-RE battery.

Trojan batteries are available through Trojan's Worldwide Master Distributor Network and Renewable Energy Wholesalers. For the nearest partners, call 800-423-6569 or +1-562-236-3000 or visit us at www.trojanbattery.com/RE

Receive your **FREE Technical Brief on Deep Cycle Technology:** visit our website at www.trojanbattery.com/RE011.

Join us at Solar 2009, Buffalo, NY • May 11 – 16, 2009
and Intersolar Munich 2009 • May 27 – 29, 2009





control system. The unit incorporates all needed counterweight and requires no truck modification or derating. Unlike conventional motive batteries, PowerEdge stays in the truck and is refueled with hydrogen in two minutes or less, allowing operators to get back to the floor immediately. PowerEdge is a smart system that comes equipped with automated controls and remote monitoring to provide enhanced fleet management capabilities. Currently available models are the C Series for Class I counterbalance trucks and the R Series for Class II reach trucks.

PowerEdge increases forklift fleet productivity by eliminating time-consuming battery changes and by providing constant voltage to the truck. This combination affords an attractive return on investment to qualified fleets. Federal subsidies recently enacted accelerate customer payback during this initial product introduction phase.

PowerEdge can be quickly refueled by PowerTap, Nuvera's complete on-site hydrogen generation and fast-fueling solution that is designed to provide the lowest cost of fuel possible. PowerEdge and PowerTap make up the Total Power Solution (TPS), and are the only purpose-built products available today specifically matched to work together for the material handling industry. For customers concerned with their carbon footprint, TPS offers an average 33 percent reduction in CO₂ emissions compared with batteries recharged with electricity.

Rechargeable Batteries Market Energized by Forecasts of Strong Growth

Whether it is a battery for a hybrid or electric vehicle, the latest laptop, or backup power for a remote telecommunications site, everyone wants a battery that has the highest energy density, best safety factor, and longest life in term of discharge cycles and ease of maintenance while still being environmentally friendly.

These are the drivers behind rechargeable battery research around the world today, notes industrial market research publisher SBI in the brand-new report, "*Advanced Rechargeable Battery Market: Emerging Worldwide Trends and Opportunities.*" Rechargeable batteries, also known as storage batteries, are a continuing strong market, with worldwide sales of \$36 billion in 2008. SBI forecasts that the rechargeable battery market will rise to \$51 billion by 2013.

Lithium-ion is the battery chemistry of choice for future generations of portable electronics and hybrid and plug-in hybrid electric vehicles. In 2008, lithium-ion battery research had more funding than all other battery technologies combined. The portable rechargeable battery market, of which lithium-ion has a 75 percent share, is the fastest growing segment of the rechargeable battery market, showing world market growth of 20 percent in 2008.

The next five years will see rechargeable batteries continue to be the energy storage system of choice for portable electronics and power tools, as well as expand into new markets in motor vehicles and large scale renewable energy systems. "Lithium-ion is the battery chemistry blazing the trail for the reality of electric cars on the road rather than concept cars on the showroom floor," said Shelley Carr, SBI associate publisher.



Since 1927, we have been developing and manufacturing high quality, German engineered Lead-Acid and Nickel-Cadmium battery systems.

Our experience means that when you suffer a power outage, we have the technology to keep you safe! In telecoms and IT, railway, power generation, UPS backup and emergency standby power, whatever your application, HOPPECKE has a fail-safe solution for your system that will give you total peace of mind.



Make your systems FAIL-SAFE!

HOPPECKE Batteries Inc.
1960 Old Cuthbert Road,
Suite 130, Cherry Hill,
NJ 08034 Tel: +1 856 616 0032
Fax: +1 856 616 0132
E-mail: info@hoppecke-us.com
www.hoppecke-us.com



HOPPECKE
POWER FROM INNOVATION

A Journey to Go Green

Hudson Technologies, a progressive deep draw manufacturer, reached an industry milestone when it completed a two-year, \$2 million conversion of its 115,000-square-foot facility to an environmentally sound aqueous cleaning system in 2008.

The conversion to greener lubricants and a new cleaning operation was not easy said President Mark Andrews. "Being on the leading edge of greener manufacturing means there is no road map to follow. At times, being on the leading edge felt more like the 'bleeding' edge. It was very challenging to make these kinds of changes while insuring tight tolerances and quality standards were met at every operation."



Hudson Technologies President Mark Andrews stands in front of the company's aqueous cleaners.

Hudson Technologies manufactures deep-drawn, or seamless, battery cases, covers and headers. They work with a wide variety of metals and alloys, including stainless steel and titanium. Their customers produce products used in some of the world's most demanding environments; inside the human body, the far reaches of the solar system and beneath the earth's crust.

The switch to biodegradable lubricants allowed Hudson Technologies, a JSJ business, to eliminate TCE (trichloroethylene), an ozone depleting and environmentally hazardous solvent many manufacturers use to clean metal parts. "Becoming environmentally friendly is good for everyone: our employees, the community and our clients. It also sets us apart and opens new doors to growth," said Andrews.

Suppliers were integral to the learning process. "We worked with our suppliers to develop effective replacements for the highly chlorinated lubricants and solvenated polymers Hudson Technologies was using," said manufacturing engineer Yoong Ho. "Working with trusted and knowledgeable suppliers was key. We tested many variations of lubricants before settling on a group of products that work with the wide range of metals we use."

In the aqueous cleaning system, manufactured parts are cleaned using up and down agitation. This vertical agitation produces a natural hydraulic purging action that forces a water-based detergent between parts and in and out of cavities, providing a high degree of fluid exchange for fast cleaning. The vertical agitation is further enhanced by basket rotation and ultrasonics. Drying is achieved by an energy efficient re-circulating air dryer with HEPA filtration.

Hudson credits working closely with an environment consultant as well as city, state and federal agencies to develop and implement a plan that insured they continued to meet regulatory standards.

Like most green initiatives, high upfront costs make this a long term investment for Hudson Technologies. However, some differentiation in the market is already being realized. "More and more customers are asking about RoHS and REACH (European Community Regulations' Registration, Evaluation, Authorization and Restriction of Chemical substance) compliant products. The changes we made to be green allow us to support our customers needing products that meet both RoHS and REACH requirements," says Ho.

The journey for Hudson Technologies continues. They are working closely with city, state and federal regulatory agencies to insure they meet all regulations and standards and to find ways to drive additional costs out of the system. This year's goals, reduce lubrication production costs and minimize the waste stream. With a new evaporator online and a waste water treatment system coming online later this year, Hudson is looking forward to being able to eliminated all aqueous cleaning water from the city waste stream. To build on their ISO 9001:2000 certification, the company has initiated the process to become compliant with the ISO 140000 series of standards on environmental management.

"We live by our corporate values, and our one of our values is "stewarding our legacy", reinventing the business for the next generation and taking responsibility for health, safety and our environment. For us, being a great company means being a greener company," said Andrews.

Contact Hudson Technologies at www.hudson-technologies.com.

Fuel Cell / Battery Combination Provides Sustainable, Green Solution for Extended Runtime in Telecom Applications

John Gagge, Jr., Senior Director of Reserve Power Engineering & Quality Assurance
Michael Kulesky, Marketing Director for Telecommunications
 EnerSys

Virtually every business today is concerned, if not obsessed with, its carbon footprint. Many companies have already come to the conclusion that going green is not only good for the environment; it's good for business as well. The telecom industry is no exception. That's why energy-efficient, sustainable solutions, such as hydrogen fuel cells, are becoming increasingly popular and more widely accepted by communications providers throughout the US and abroad.

In the aftermath of Hurricane Katrina, which saw vital communications links such as 911 services fail as the power grid went out and AC power was lost, a panel appointed by the FCC requested telecom companies to implement solutions that would provide longer emergency power runtimes for critical areas of their networks.

Lead acid batteries dominate the backup power market and provide approximately four to eight hours of reserve power at each cellular site. Diesel gas generators are also a viable alternative that allow telecom operators to achieve extended runtimes and strengthen their communications infrastructure. Interest in fuel cells for telecom applications, however, continues to grow for a number of good reasons.

Fuel Cells Are Clean And Green

A Proton Exchange Membrane (PEM) fuel cell backed by a premium, maintenance-free lead acid battery, can provide an optimum solution for extended runtimes at telecom sites. In comparison to loud and dirty diesel generators, fuel cells provide green advantages and a low-impact energy solution.

Eco-friendly fuel cells do not emit pollutants; they produce only water and heat byproducts, which have no impact on the environment. Generally speaking, fuel cells have a smaller footprint and are easier and less expensive to install than generators. In addition, fuel cells are nearly maintenance free, requiring only a simple air filter change after every 500 hours of operation.

Issues usually associated with diesel generators, such as fuel spillage and spoilage, carbon emissions and noise, are never a concern with PEM fuel cell/battery hybrids. Self-contained fuel cell units have the versatility to operate indoors or outdoors and can be safely installed in most places, including building rooftops where space is at a premium and weight restrictions are an important consideration. Pending government legislation may prohibit diesel generators from being sited on rooftops as well as restrict the amount of time the generator can run before the power source must be switched over to a backup battery.


Fuel cells use renewable, readily-available, commercial-grade hydrogen that has unlimited shelf life. Generators, on the other hand, run on diesel fuel that can only be stored for a limited period of time before it must be replaced. While fuel cells can be remotely monitored for easy and efficient upkeep, generators require trained mechanics to perform regularly scheduled maintenance to ensure reliable emergency power.

Efficient Operation and Long Service Life

A typical PEM fuel cell consists of a bi-polar plate with an anode on one side and cathode on the other side. Airflow across one side of the plate and hydrogen on the other side of the plate, coupled with the use of a membrane, facilitates proton exchange, which is captured as usable electricity. Fuel cells are considered a clean technology because they use hydrogen and generate water.

Today's fuel cells can operate continuously for up to 20,000-plus hours. They are even more reliable and cost effective than models produced only a few years ago. PEM fuel cells typically run from a low end of 1 kW to the high end of 20

EnerSys Continued on Page 12



Precision Counts


Quality you can rely on for
Interconnect Components & Hardware

Our Catalog M55 also includes:

- Battery Clips, Contacts & Holders
- Fuse Clips & Holders • Spacers & Standoffs
- Terminals & Test Points • PC Board Hardware
- Panel Hardware • Terminal Boards
- Pins, Plugs, Jacks & Sockets
- Multi-Purpose Hardware

Call or Click for Catalog M55

Engineering Services Available



KEYSTONE
ELECTRONICS CORP.

RoHS Compliant - ISO 9001 Certified

(718) 956-8900 • (800) 221-5510 • FAX (718) 956-9040
 e-mail: kec@keyelco.com • Website: keyelco.com

Battery Holders, Clips & Contacts
 Available from our global distributor network

kW, with most centered on 5 kW to 10 kW to meet telecom base station requirements. Because time is needed for the fuel cell to engage in an emergency situation, and hydrogen has to be replaced, a battery is used to power the load until the situation is determined to be catastrophic. This complementary set-up can be configured to provide eight hours of runtime for batteries, 48 hours for fuel cells, or 160 hours as a combined solution.

Modern fuel cells are also modular and scalable. Users can start with a 5 kW system and add capacity to the site as the need for backup power grows. Fuel cells can be configured to fit inside a standard relay rack or installed in a cabinet that can be wall mounted or set on an exterior concrete pad.

Longer Runtime

Fuel cells combined with maintenance-free batteries can provide exceptional runtimes when batteries are discharged during the hours when the site loading is lower. This reduces the total Depth of Discharge (DOD) on the batteries and maximizes cycle life.

During the day, the fuel cell supports the site load and recharges the batteries to prepare them for discharge the following evening. This alternating pattern of fuel cell and battery use optimizes DOD and controls battery recharge. More importantly, the fuel cell/battery combination can produce runtimes of more than 160 hours. In complete outage situations, telecom sites using fuel cells to provide emergency power can run unattended for six days, essentially operating as an off-grid system.

Less Maintenance

Maintenance on fuel cells has been dramatically reduced as a result of high-speed manufacturing processes that have improved reliability and serviceability. In fact, some designs have routine maintenance schedules programmed into their normal operation, which enables maintenance guidelines to be focused on operating intervals rather than calendar days. Since the unit operates as a solid-state device, fuel levels can be checked automatically, the system can perform self-diagnosis and alarms can be outputted to the base station network for easy monitoring or to alert operators of problems.

In effect, all maintenance checks can be scheduled based on actual outage times or coordinated with other regular site visits. In this unique pairing of battery and fuel cell, it is critical that the battery is reliable and designed to withstand harsh operating conditions. In extreme cases, the battery will be discharged multiple times and expected to stand on open circuit for extended periods or sit on float while not in use.



Extended Runtime Solution with Batteries and Fuel Cells

Incentives to Go Green

In today's political landscape dotted with stimulus programs, carbon credits and tax breaks, the incentives for companies to develop a green infrastructure and focus on sustainability are very attractive. Incentives include a federal fuel cell investment tax credit, with a maximum claim of up to \$3,000 per kW; a federal alternative fuel infrastructure tax credit that covers 30 percent of the cost of installing alternative fueling equipment up to \$30,000; and a federal modified accelerated cost-recovery system (MACRS) that allows businesses to recover investments in certain properties through depreciation deductions.

Under the MACRS program, fuel cells are classified as a five-year property. If the property meets program requirements, the owner is entitled to deduct 50 percent of the adjusted basis of the property in the current year. An ordinary depreciation schedule would apply to the remaining 50 percent.

With the help of the federal, state and local programs, incorporating PEM fuel cell technology to extend runtimes for telecom applications can no longer be considered cost-prohibitive.

The Positive Impact of Fuel Cells

As the world continues to evolve and grow as a wireless society, demand for backup power on the wireless infrastructure will increase significantly. In a market historically serviced by batteries and diesel generators, an eco-friendly solutions-based fuel cell/battery combination is a welcome step in the right direction for telecom operators and the environment.

Robust, reliable, mass-produced and cost-effective fuel cells coupled with premium, maintenance-free lead acid batteries provide a low-noise, no-emissions, reduced-maintenance and cost-effective solution for extended runtime, and eliminate dependency on fossil fuel generators. By incorporating a synergistic blend of materials and design features that provide superior performance, fuel cell/battery hybrids satisfy user requirements for long life, design flexibility, high energy density, compact configuration and high cycling.

When it comes to emergency power solutions, sustainability is not a passing fad, it is a mandate for long-term business success.

John Gagge is the senior director of Engineering & Quality Assurance for the Americas at EnerSys. He oversees product/process development, new product introductions, applications engineering and quality assurance activities for the Motive and Reserve Power lines of business.

A telecom business veteran of more than 10 years, Mike Kulesky is director of Marketing for Telecommunications at EnerSys. Previously, he worked at Lucent Technologies for many years, supporting a wide range of power projects and products.

Contact EnerSys at www.enersys.com or www.extendedruntimesolutions.com.

World's #1 Rechargeable Battery Provider
Top-Notch Customer Service and Technical Support

We believe that providing superior tech support, delivering product as promised and reliability that exceeds spec is just the way one does business in a technical world. It's the marketing guys that love the awards. But we know it's the day-to-day that makes us the #1 provider of batteries to your market.

C'mon, Challenge us. Contact us at us.sanyo.com with your toughest spec.

SANYO
Batteries
The Biggest & The Best

us.sanyo.com

Webcom's 2009 Worldwide Battery Industry Directory

2009 Worldwide Battery Industry Directory
Manufacturers and Distributors of Primary and Secondary Batteries, Battery Packs, Chargers, Testers, Repairs of Battery Manufacturing Equipment and Supplies, Repairs of Battery Power Components

Battery Manufacturers, Power Management Companies Charging, Testing & Monitoring Companies Component Manufacturers, Suppliers, Distributors, OEMs and more!

With Webcom's 2009 Worldwide Battery Industry Directory, you can increase your sales, enhance your marketing efforts, perform market research, find new suppliers and monitor your competition.

Each directory provides the most comprehensive, accurate and up-to-date industry listings.

The 2009 directory provides details for more than **4,500 contacts and 2,700 companies**
Available in hard copy, CD-ROM and PDF

Company Listings include:
Names and titles of key personnel in all functions, type of company, year established, revenue range, markets served, number of employees, plus much more

For more information or to order, contact:
Webcom Communications Corp. | 7355 E. Orchard Rd., Suite 100 | Greenwood Village, CO 80111
Phone 800-803-9488 or 720-528-3770 | Fax 720-528-3771
www.infowebcom.com or marcv@infowebcom.com

Assuming Responsibility for E-Waste Through Recycling: Emerging Issues with Product Stewardship Initiatives

Carl Smith, CEO
Rechargeable Battery Recycling Corp.

As the issue of e-waste has moved to the forefront of green initiatives, it is increasingly important for businesses, municipalities, environmentalists and manufacturers to understand the emerging responsibility for reducing the environmental impacts of products. In addition to reducing packaging, streamlining manufacturing processes and using recycled materials, this means providing end-users with a convenient and accessible way to dispose of their electronics in an environmentally sound manner.

The concept of product stewardship stems from environmental concerns of how to properly manage a potentially hazardous product at the end of its useful life. When used in relation to e-waste, how the terms "properly" and "manage" are defined depends upon the audiences involved. What should be recycled and who bears the financial responsibility are points for discussion as these and other issues involving e-waste are examined. The success of e-waste recycling programs depends upon safe handling of the components in electronics products, cost-effective recycling processes and addressing legislation. As America's consumption of electronics continues to increase, we must swiftly deal with the growing rise of e-waste in our communities.

Electronic Waste Legislation

As new electronics come to market, disposing of the products they replace will place higher demands on our swelling landfills. The notion of product stewardship was initially designated to manage hazardous chemicals found in paints and mercury-containing products.

In North America, several Canadian provinces have implemented product stewardship legislation that ranges from cell phones and televisions to paints and medical waste. Stewardship Ontario, working with municipalities and retailers, created the Municipal Hazardous or Special Waste (MHSW) program to recover potentially hazardous wastes (including alkaline batteries); while in British Columbia, the Ministry of Environment recently added electronic products, including alkaline and rechargeable batteries to a list of items that must be accounted for with product stewardship programs in accordance with the Environmental Management Act.

In the US Congress enacted legislation in 1996 known as The Mercury-Containing and Rechargeable Battery Management Act, which requires alkaline manufacturers to phase out the use of mercury in production, while requiring rechargeable battery manufacturers to label nickel cadmium (Ni-Cd) batteries as recyclable and establish a free and easy consumer recycling program. In addition to the federal law, nine US states (California, Connecticut, Florida, Iowa,

Maine, Maryland, Minnesota, New Jersey and Vermont) also require the industry to implement state-approved rechargeable battery recycling programs. More recently, New York City created legislation requiring retailers to assume this responsibility.

Compliance with these examples of North American e-waste legislation can be achieved using the Rechargeable Battery Recycling Corp.'s (RBRC) Call2Recycle program as a turnkey solution. Founded in 1994 as a non-profit organization by the rechargeable battery industry, the program is the industry's first and only product stewardship program for rechargeable batteries, providing a comprehensive, environmentally sound, free and easy recycling solution in the US and Canada. To date, the program has successfully recycled more than 50 million pounds of rechargeable batteries.

E-waste is growing at a faster rate than other municipal waste [1]. It is no surprise that the introduction of new legislation coincides with the rate of e-waste disposal. The US Environmental Protection Agency (EPA) reported that mandatory recycling of electronics through e-waste legislation could account for "an increase of eighteen percent of the overall amount recycled between the years 2006 and 2007." The potential influx of e-waste and its impact on the environment are enormous. Laptop computer are replaced every three years [2] while desktop comput-

RBRC Continued on Page 14

1st Int'l Rechargeable Battery Expo

BATTERY JAPAN

LIB / NIMH
Capacitor
Inspection / Testing
Manufacturing Equipment
Material / Component

Dates: **March 3 (Wed) - 5 (Fri), 2010**
 Venue: **Tokyo Big Sight, Japan**
 Organised by: **Reed Exhibitions Japan Ltd.**

Concurrently held with:

World's Largest

6th Int'l Hydrogen & Fuel Cell Expo

FC EXPO 2010

ASIA's Largest

3rd Int'l Photovoltaic Power Generation Expo


PV EXPO 2010

1,300 Exhibitors & 88,000 Visitors!

* expected/including concurrent shows

BOOK YOUR SPACE NOW!

Newly Launched in Japan!



Market Leaders from around the world will congregate in JAPAN!

for more information >>> <http://www.batteryjapan.jp/en/>

Organised by **Reed Exhibitions**

BATTERY JAPAN Show Management Reed Exhibitions Japan Ltd.
 18F Shinjuku-Nomura Bldg., 1-26-2 Nishishinjuku, Shinjuku-ku, Tokyo 163-0570, Japan
 TEL: +81-3-3349-8576 FAX: +81-3-3349-8535 E-mail: bj-pr@reedexpo.co.jp

ers average a two to four-year expected lifespan. Within the next five years, more than 350 million computers will become obsolete [3]. Recent media scrutiny on the illegal export of e-waste to developing countries sheds further light on how the improper disposal of these hazardous materials will damage human and environmental health.

Challenges for Viability

Sustaining Through Reuse

Both the public and policymakers have expressed concerns over potentially harmful materials contained in certain products entering the environment. Proper disposal must mean more than simply diverting these items from landfills and incinerators, but rather minimizing the impact of waste on the environment.

When rechargeable batteries are recycled, the reclaimed nickel and iron are used to make stainless steel. Cobalt and lead are also extracted for reuse, while the cadmium is used to make new Ni-Cd batteries. The battery electrolyte is used in the facility's wastewater treatment plant. The remaining non-hazardous byproducts create slag that is used as road base and construction aggregate. The waste-less process ensures the preservation of natural resources, eliminates long-term landfill liability, and is environmentally sound in that none of the waste byproducts leave North America.

Other electronics require slightly different recovery processes to ensure careful extraction of choice materials. For example, improperly disassembling old computer monitors and CPU units to recover copper, gold and iron can release toxic dust. Careful planning is needed to determine effective materials recovery of electronics filled with various metals that require separate recycling processes and special handling. Many companies currently offer varying levels of e-waste recycling and are poised and ready to receive the amount of e-waste that Americans generate.

Many in the industry believe that alkaline batteries do not pose a risk to environmental or human health because of the exclusion of mercury. However, consumer expectation that all batteries should be managed as e-waste, though no cost-effective comprehensive recycling process currently exists, compels both policymakers and battery manufacturers to address the issue sooner than later. When recycling is an option over landfill or incinerator, support and funding for a recycling program is encouraged to maintain these programs.

Explicit vs. Implied Fees

In the example of the Call2Recycle program, operating fees obtained from the industry are essential for the feasibility of rechargeable battery recycling since revenue from the resale of reusable metals is itself not sufficient. The volatility of the reclaimed metals markets is precisely why the resale of recovered materials should not be the driving force behind maintaining a program that diverts and reuses harmful heavy metals. Without the support of product stewardship, it is less likely that cost-effective recycling programs can exist.

In some industries, recycling programs are sustained by charging a fee (or surcharge) for disposal, placing the financial responsibility upon the end user. Examples of fee-based recycling include bottle deposits, vehicle tires and automotive batteries. Most recently, a proliferation of trade-in programs promise consumers cash for unwanted electronics including cell phones, laptop computers,

mp3 players, GPS devices, digital cameras, camcorders, game consoles, video monitors and printers.

When disposal fees are reasonable (whether explicit or embedded), it is less likely to deter consumer participation in recycling. While a consumer may not balk at a five-cent deposit on a glass bottle, a fee for electronics may be far greater than a few pennies per item. With the cost of a laptop battery averaging \$80, will consumers be willing to pay an extra ten dollars at the time of purchase to guarantee that their used battery is recycled properly at end of life?

Given the unstable prices for resalable byproducts, additional funds are necessary to administer a recycling program. Such funds help pay for a public education campaign, transportation of e-waste, and maintain a viable and safe infrastructure for collection and recycling. Without financial support for product stewardship, ensuring proper recycling is not guaranteed.

Safety, Handling and Transportation

While various forms of infrastructures exist for municipal waste collection of common recyclable items, the handling of e-waste presents a unique set of challenges. Unlike glass, paper and plastic, special handling is needed for e-waste, as the multiple components found in e-waste require different recovery processes than common recyclable items.

Used rechargeable batteries are considered hazardous waste and therefore require special handling to ensure safety during storage and transport. Rechargeable batteries must have their terminals covered with nonconductive tape or be placed in individual plastic bags. From the doubled-walled collection box and supply of plastic bags to minimize the potential risk of fire during storage or transport, to safety instructions imprinted on the box, safety training is enforced with program participants to protect personnel and property. Used rechargeable batteries are shipped by ground courier only per the US Department of Transportation requirements for transporting hazardous materials in accordance with the Universal Waste Rule.

Public Awareness

Studies have shown that the average consumer does not differentiate between alkaline and rechargeable batteries. According to a survey conducted by Polaris Marketing Research on behalf of RBRC, consumers indicated how many common cordless electronic products powered by rechargeable batteries they use, but then identified a much lower number when asked how many rechargeable batteries were in their home. This may be due to the fact that the consumer rarely interacts with the rechargeable battery during the product's life cycle. Cordless products are designed so that the entire unit is plugged into a power supply to recharge. Often, the consumer may upgrade or dispose of the entire unit before ever removing or replacing the battery.

But the survey found that when a consumer does replace their rechargeable batteries, 61 percent are either throwing them away or "hoarding" them. While many are unaware of existing e-waste recycling programs, there is inherent awareness that these products should not be thrown into the trash.

Furthermore, another survey conducted for RBRC, by GFK Custom Research, revealed that more than 93 percent of Americans would be more likely to recycle their used rechargeable batteries and old cell phones if there was a convenient local retail drop-off location. Standardizing e-waste collections that require manufacturers to provide a nationwide program at no cost would greatly increase consumer participation and increase recycling rates. By committing product stewardship at the beginning of product development, manufacturers can anticipate customers' desire to properly manage e-waste while also enhancing their own corporate responsibility.

References

- [1] Municipal Solid Waste in the United States: 2007 Facts and Figures. United States Environmental Protection Agency.
- [2] Consumer Electronics Association. Market Research Report: Trends in CE Reuse, Recycle and Removal. April 2008.
- [3] National Safety Council's Environmental Health Center. Electronic Product Recovery and Recycling Baseline Report: Recycling of Selected Electronic Products in the United States. 2002

Contact RBRC at www.rbrc.org.

Remote 2009
CONFERENCE AND EXPO

SCADA, Device Networking, M2M, Wireless Technology, Onsite Power, And Security for Remote Sites and Equipment

Remote 2009 is the only conference in the world exclusively dedicated to SCADA and remote monitoring, networking, onsite power and security for distributed equipment

No other industry conference brings together technology users that manage remote sites like the Remote 2009 Conference and Expo. Our highly technical sessions will provide cutting-edge technology direction and application strategies from the companies and users driving the growth in onsite powering, SCADA, M2M, remote networking, data communications, system & site security, emerging wireless technology, remote monitoring and automated control of distributed equipment, networks and facilities.

Save These Dates:
Show: Oct 29th - 30th, 2009 • San Antonio, Texas

FOR MORE INFORMATION VISIT: WWW.REMOTEMAGAZINE.COM

IEEE 1625 BATTERY STANDARD

Recent Changes to Improve Safety

Robin Sarah Tichy, Technical Marketing Manager
Micro Power Electronics

Earlier in the decade, several very public laptop and factory fires prompted recalls due to safety concerns related to batteries. The battery industry is slowly recovering from the long lasting effects of these recalls, from cell supply shortage to public misconception. Steps have been taken to ensure that these events do not recur; the IEEE Standards Association, the standards-setting body of the Institute of Electrical and Electronics Engineers (IEEE) has published two standards relevant to the design and manufacture of portable battery systems: 1625 Standard for Rechargeable Batteries for Portable Computing and 1725 Standard for Rechargeable Batteries for Cellular Telephones. The 1625 standard was originally published in 2004, and an update was just published late in 2008. The motivation for the reworking of the document was largely driven by the laptop fires. IEEE 1625 guides the industry in planning and implementing controls for battery design and manufacture. Safety and the prevention of dangerous malfunction was at the forefront of discussions among the document's contributors. Ubiquitous brands such as Dell, HP, Panasonic, Sanyo and Sony were all represented. The standard also defines approaches for evaluating and qualifying such batteries, verifying their quality and reliability, and educating and communicating with end users.

In great detail, the standard addresses battery pack electrical and mechanical construction, qualification processes, manufacturing process control, packaging technologies and numerous other topics. The goal of this standard was to establish criteria for design, analysis for qualification, quality and reliability of rechargeable battery systems for portable computing, but the battery industry can utilize this guideline as a resource to ensure a safe and reliable end user experience across many diverse types of products.

In a press release regarding the new standard Edward Rashba, manager, New Technical Programs at the IEEE-SA said, "In revising IEEE 1625 to further safeguard the reliability of these batteries, we will leverage the streamlined corporate standards process and incorporate lessons learned in developing the IEEE 1725 standard for cellular telephone batteries. We have an opportunity to further strengthen the Livium portfolio, which already incorporates hundreds of man-hours of technical work and represents consensus views on best practices from leading industry experts."

IEEE 1625 adopts a systems approach by addressing the battery envelope from cells to the mobile computers they power, both alone and in concert. It encompasses such areas as battery pack electrical and mechanical construction, cell chemistries, packaging, pack and cell controls, and overall system considerations. Engineers may be familiar with original 1625, but changes and safety considerations deserve a timely review to understand the most useful and broadly relevant guidelines.

The standard guides the system and subsystem designers through five major areas: system integration, cell, pack, host device and total system reliability. This organization of the document remains largely unchanged in the revised version. Also covered are the critical operational parameters and how they change with time and environment, the effects of extremes in temperature and the management of component failure.

Although the designers of the overall system and its various subsystems, such as the cells, are affected by this standard, here we focus on the design of the battery pack to highlight where the standard is used and the benefits it can bring to safety and reliability of the overall system.

Battery pack considerations are outlined in section six of the document and this clause includes, "design analysis, manufacturing and testing of rechargeable Li-ion and Li-ion polymer battery packs to ensure reliable performance over the product life of the mobile computing device." One of the most important paragraphs, from a safety standpoint, is the one on testing, which appears at the end of the battery pack section. The IEEE 1625 standard is harmonized with the relevant standards from compli-

Micro Power Continued on Page 16

Optimize Battery Performance with Henkel's Innovative Acheson™ DAG® Conductive Coatings

Henkel offers a global portfolio of Acheson™ DAG® high performance coatings for battery cans and current collectors for alkaline or lithium-ion battery applications. Utilizing core competencies in dispersion science and graphite particle size manipulation, the electrical characteristics of these carbon-based coatings can be customized to the specific needs of individual applications.

Benefits Include:

- Water-based coatings that are free of heavy metals
- Low VOC
- Superior current drain performance and can corrosion protection
- Extended battery life
- Repeatable and reliable cycle life
- Extended shelf life through reduced leakage, self-discharge
- Lower cell internal impedance and electrical resistance

Look to Henkel for innovative technologies backed by world-class customer service and technical support.

For additional information, please visit www.henkelna.com/metals or call 866.332.7024.



A Powerful New Tool for Battery Research

Higher Voltage and Current


Fast, Sensitive, Stable... All This, and Exceptional Power, too!

Features:

- EIS max frequency: 7 MHz
- Reference voltage: +/-48 V
- Measurement potential resolution: 750 nV
- Current ranges: 1 A to 10 pA f.s.
- Current resolution: fA
- Floating mode
- Analog filtering
- Full stability control

SP-300

NEW



Reference Control +/-48 Volts

Current Ranges 1 A to 10 pA f.s.

Designed by Electrochemists... for Electrochemists

Outside USA: Bio-Logic SAS • Tel: +33 476 98 68 31 • Web: www.bio-logic.info

USA Customers:

BioLogic USA

Science Instruments

Phone: 865.769.3800

Web: www.bio-logic.us

ance or certification bodies such as Underwriters Laboratories (UL). Regulatory requirements referenced in the standard include UL 2054, UL 69050-1, IEC 62133 and the transportation tests and requirements for shipping outlined in the UN manual of Tests and Criteria (ST/SG/AC.10/11). Also, the very last clause in the section is particularly notable. There it is stated that the batteries should be shipped at a state of charge of 50 percent or less, in order to limit the energy available to drive faults.

Safety considerations are detailed throughout the section 6, which can be roughly divided into the cell selection, circuitry design, mechanical design and battery pack manufacturing. A battery pack, representative of a lap top configuration is shown in Figure 1. The IEEE standard addresses each of the components of the battery pack. This example is constructed of six 18650 cells, a printed circuit board for the battery safety, intelligence and communication, a mechanical enclosure and



Figure 1.

a connector. The 18650 cells are 18 mm in diameter and 65 mm long. These high capacity cells are the most common type of Li-ion cells used in lap top computers.

Cell Selection

Since many of the high profile battery pack failures originated at the cell level, much of the new requirements outlined in the document were intended as cell manufacturing and specification guidelines. The addition of a cell specification sheet, provided by the cell supplier, with specific usage information, is crucial for the safe and reliable design of the battery pack. This is to ensure that the pack designer receives complete information about the cells and that the cells are used in appropriate operating conditions. There is a template included at the end of the document that provides a guideline for the type of generic information that is intended to be included in the cell specification sheet. This information ranges from dimensional specifications to use limitations. Additionally, the pack designer is to receive information specific to their design, such as maximum charge current as a function of temperature. Cells should be matched per specification for voltage, capacity, size, age and manufacturer, and cells that are reworked are not allowed.

Battery Management and Safety Circuitry

The battery management circuit is intended to ensure safe operation by setting the upper limit for discharge and charge current, voltage, temperature and time. These limits should be in harmony with those dictated by the cell specification sheet. New lan-

guage in the document states that production level samples should be tested to verify these limits and periodic retests should be performed. Guidelines for layout of the electrical components of the battery pack provide inherent safety and protection against shorting. There are guidelines for the cell connection spacing, runners and solder pads. There are new recommendations for the information that the battery records and reports. For example, historic storage information should be recorded, and if a fault does occur, it is now recommended that the battery pack communicate the nature of the fault to the host device. Lastly, pack authentication is now a requirement and redundant overvoltage is a new, very stringent design criteria.

Mechanical Design

Isolation of the various components resident in the battery pack is one of the safety elements of the mechanical design and physical layout of the battery pack. Thermal isolation of the battery circuit board from the cells is a new recommendation. Not only should the board be isolated from the cells the board is to be located away from the cells' vent paths. The vents should be aimed away from the user as well. Of course, cell vents should never be covered or obstructed. The cells should be insulated from each other and connected with adequate welds. The enclosure must fully encapsulate the cells to prevent electrolyte leakage, but allow for the escape of any vented gases and must be made of a flame retardant material. Finally, the connector design must prevent incorrect insertion into the host device.

Production and Manufacturing

The new standard provides some guidelines regarding manufacturing practices that ensure safety. The most notable requirement is the testing of 100 percent of packs for functionality prior to shipment. In addition, sample testing is required in numbers designated by the relevant ANSI standards. Drop and vibration tests are specified by the UL and IEC standards, respectively. Pull tests on the tab welds are also required.

A Design Failure Modes and Effects Analysis (DFMEA) approach is a typical example of an industry-wide methodology that can be used to highlight and prioritize the possible roots of faults and hazards and is a best practice procedure to reduce and minimize potential latent problems. FMEAs of both design and manufacturing process are mandatory for medical device batteries, in fact, and it is now required that this type of analysis is performed on any new battery pack design that is intended to comply with IEEE 1625. Typically, evaluation and scoring is based on experience and statistical reliability data. However, this data is not always available. In such cases, the guidance found in IEEE 1625 standard is beneficial because it forces important areas of the system to have specific protection levels and features.

The design methodologies described in the IEEE 1625 standard are based on lessons learned throughout the industry and ensure the safety and reliability of their designs even when the speed of design is paramount. The standard covers design approaches that ensure reliable operation and that minimize the occurrence of faults leading to hazards in portable computing devices and other rechargeable battery-operated systems. From the beginning of the design of a portable device, it is necessary to examine all facets of the design, including the battery pack, to ensure the reliability of operation and the safety of the end user.

Contact Micro Power Electronics at www.micro-power.com.

Introducing AlphaRac™ Battery Rack Systems

- AlphaRac™ battery racks are specifically designed for the industrial market and can accommodate practically all types and brands of batteries
- Highly customizable to meet special applications or unusual installation requirements
- Modular design allows for system versatility
- Wide range of in-stock rack configurations gives you the option to maximize space and minimize costs

800 996 6104
www.alpha.com/power Industrial Power Solutions™

2009 SEPTEMBER 1-2, 2009
HYATT REGENCY • PHILADELPHIA, PA
WWW.ANTENNASONLINE.COM

ANTENNA SYSTEMS CONFERENCE

THE WORLD'S PREMIER CONFERENCE ON THE LATEST ADVANCEMENTS IN ANTENNA SYSTEMS & TECHNOLOGY

WHY ATTEND

- In-depth technical sessions & discussions
- Interactive exhibition with new products & technology
- Informative pre-conference workshops
- Unmatched networking opportunities
- Chance to discover what's coming next

WHO SHOULD ATTEND

- OEM design engineers
- Systems engineers & operators
- End-users
- System integrators
- Component manufacturers / providers
- Antenna manufacturers
- Product managers
- Value-added resellers / distributors
- Wireless professionals

NOW ACCEPTING ABSTRACTS
Contact Jeremy Martin (jereym@infowebcom.com) with questions or visit www.AntennasOnline.com

Plug-In Hybrid Electric Vehicles in Stimulus Act: What's in Store for the Battery Industry?

Suba Arunkumar, Industry Analyst, Energy & Power Systems Group
Frost & Sullivan

Plug-in hybrid electric vehicles (PHEVs) gained great importance when US President Barack Obama signed the American Recovery and Reinvestment Act of 2009 in February of this year. The government's support in promoting PHEVs developed in the US is evident through this financial assistance program, which encourages the major automotive and ancillary manufacturers to work for PHEVs. To promote usage of PHEVs in an economic slump with low gas prices, a tax credit of up to \$7,500 is offered to families purchasing these vehicles which normally weigh 10,000 pounds or less. This tax credit is offered for 200,000 PHEVs of every manufacturer. Additionally, this package did not alter the existing tax credit of \$10,000 for vehicles with gross vehicle weight of 10,000 to 14,000 pounds. Similarly, for heavy weighing vehicles of weight ranging from 14,000 to 26,000 pounds, tax credit of \$12,500 is offered, while a credit of \$15,000 for vehicles weighing more than 26,000 pounds is offered by the government.

These initiatives indicate the importance given to PHEVs and the efforts taken to make people use PHEVs on a large scale. This reduces the dependence on oil and gas to a large extent and could strengthen the economy to a substantial level. Government support in this project is imperative for the US to succeed in becoming a formidable producer of lithium-ion batteries for PHEVs.

The Future of the Battery Industry

The American Recovery and Reinvestment act facilitated the Department of Energy (DOE) to offer \$2.4 billion to support next-generation electric vehicles. The recent announcement by the President indicates that the DOE has started taking grant proposals from electric vehicle battery manufacturers, explaining the influence that this package has created in the battery industry. Of this \$2.4 billion, however, \$1.5 billion is available to support the US electric vehicle battery manufacturing, \$500 million supports the related technologies, while another \$400 million is offered to demonstrate and evaluate PHEVs and other electric infrastructure components. Some of these components include charging stations and training for technicians to repair PHEVs. Without offering support to the related technologies such as electric motors and components, the success of battery chemistries and battery development would be incomplete. This grant is likely to rejuvenate the battery industry encouraging many US battery manufacturers to work with the major automotive manufacturers in developing the most suitable battery for PHEVs. Apart from these programs, an additional \$400 million is allotted to support efforts to add electric technologies to the existing conventional vehicles. This is a good initiative to encourage the conversion of a conventional vehicle to a hybrid electric vehicle.

This stimulus package is a source of support and encouragement to the US battery manufacturers, such as A123Systems and EnerDel, Inc. As most of the commercially viable, mass producing electric vehicle battery manufacturers are from the Asian region, this bill expects to be a good opportunity for many start-up battery manufacturers from the US to establish their presence in the PHEV battery market.

The US electric vehicle battery manufacturers

are relatively small in terms of mass production when compared to the Asian manufacturers in terms of volumes of batteries. With this stimulus package, US manufacturers are encouraged to develop advanced batteries for PHEVs. The \$2.4 billion grant, coupled with tax credits to cover 30 percent of the plant cost, helps to increase the manufacturing of batteries, thereby increasing the market size of the US. This helps in achieving the goal set by President Obama of having 1 million PHEVs on the road by 2015.

From a consumer's perspective, the tax credit is increased for heavy vehicles with higher battery capacity. This is likely to create significant demand for all vehicle types, ranging from passenger cars to heavy vehicles. This stimulus bill encourages battery manufacturers to develop the most efficient and suitable battery for PHEVs from a US

Frost & Sullivan Continued on Page 18

EVE
ENERGY VERY ENDURING

EVE--provides the most enduring lithium batteries.

ENERGY VERY ENDURING

- Over 20 years R & D experience
- More than ten million batteries serving on meters
- Manufacturer
- Provide 42 kinds of Li/SOCL₂ batteries
- Provide 41 kinds of Li/MnO₂ batteries
- 27 patents

EVE ENERGY CO.,LTD. ADD: EVE Industrial Park, Xing Industrial zone, Hufuan Town, Huzhou, Guangdong, China. Tel: +86-752-2601898 Fax: +86-752-2600033 E-Mail: Connie@evebattery.com Website: www.evebattery.com

POWER YOUR PRODUCTS FROM LIGHT

Maximize Battery Life with Easy-to-Use IXYS SolarBits™

- SolarBits™ are a surface mountable assembly of IXYS Solar Cells - no wire bonding or special handling required!
- Extend the battery life of Portable Electronic Products (music player, mobile phone, camera, PDA, and more)
- Replace batteries or power supplies in hazardous environments
- Power for wireless sensors and transmitters

For part numbers and more information, go to www.ixysolar.com

Photovoltaic Gate Driver www.clare.com

Eval Boards Available www.ixyscolorado.com

IXYSSOLAR

For technical information, call Gib Bates at (970) 493-1902 ext. 22

New, Ultra-Safe Battery Will Reduce Number of Batteries Troops Need in the Field, and Save Weight and Logistics Needed for Transportation

K2 Energy Solutions, a manufacturer of rechargeable battery systems for electric vehicles and energy storage applications, has been awarded a \$119,000 contract by the US Army's Communications-Electronics Research, Development and Engineering Center (CERDEC) at Fort Monmouth, New Jersey.

The contract was awarded under the Army's Small Business Innovation Research (SBIR) program and calls for the development of an improved, ultra-safe BB-2590 rechargeable battery, a high-power lithium ion battery for military applications.

As one of the most advanced rechargeable batteries of its kind, the BB-2590 is designed to power a variety of rugged military devices including portable electronics, military communication systems, robotics, Unmanned Aerial Vehicles (UAV) and Unmanned Underwater Vehicles (UUV). An advanced, more powerful BB-2590 will allow the Army to utilize the battery for more complex applications such as Non-Line-of-Sight missile firing.

"This new contract allows K2 to take the Lithium Ion Phosphate battery technology we've already developed for commercial use and modify it in a way that is advantageous for the military," said Jim Hodge, chief technical officer at K2. "Not only will this new generation of battery provide the Army with a more powerful form of portable energy, but it will be at a much lower cost than hi-grade batteries currently being deployed."

K2 Energy Solutions has been tapped by the Army to create an updated BB-2590 battery that is three times as powerful, can be used longer, is lighter weight, is capable of a faster recharge and costs less than the original. Such improvements will drastically reduce the number of batteries troops must carry in the field, and save weight and logistics needed to transport the battery to the field.

UPM Raflatac and Blue Spark Technologies Partner to Drive New Battery Assisted Passive RFID Research And Product Development

UPM Raflatac and Blue Spark Technologies have formed a partnership specifically targeted towards the development and launch of new and innovative products and applications in the emerging battery assisted passive (BAP) RFID market.

Both companies bring to the alliance their own deep and unique product knowledge and engineering expertise applicable to BAP RFID technology. UPM Raflatac is a developer and supplier of HF and UHF radio frequency identification (RFID) tags and inlays and self-adhesive label materials. Blue Spark is a supplier of thin, flexible printed battery solutions suitable for use in a host of industrial and consumer applications, including RFID and smart cards.

The research and development partnership was enabled with the launch of a new EPC Gen2 battery assisted passive RFID chip from Swiss-based EM Microelectronic. EM's new EM4324 RFID chip is capable of battery assisted read ranges up to 50 meters (154 feet) and features 1024 bits of non-volatile memory. The chip includes a "low battery" alarm. Radio frequency performance and durability assurance will be provided by UPM Raflatac's tag and inlay design capabilities, supported by the company's worldwide production and testing facilities. Power will be supplied by a variety of Blue Spark's thin, flexible printed battery solutions, including the ultra-thin Blue Spark UT series.

"Blue Spark is excited to partner with industry leader UPM Raflatac. Together, we can leverage our knowledge and experience to create a virtual 'idea factory' that will enable us to develop and test excit-

ing new products built around our respective technologies and bring them to market in a timely way," said Gary Johnson, president and CEO for Blue Spark Technologies

Both companies view battery assisted passive RFID as the next chapter in the evolution of the RFID market. BAP effectively bridges the gap between pure passive RFID technology and high-end active and real-time location systems (RTLS), from both a price and performance standpoint. The companies will focus their efforts on developing high-volume BAP RFID-enabled products for consumer, life sciences and industrial markets.

Saft Receives \$13 Million Contract from Raytheon to Power ITAS

The Raytheon Company has awarded Saft a \$13 million contract to supply its rechargeable lithium-ion (Li-ion) battery systems for the Improved Target Acquisition System (ITAS). This is the second largest order Raytheon has placed for the Li-ion systems since choosing Saft as battery supplier for ITAS nearly five years ago.

Under the new contract, Saft will begin to provide the batteries to Raytheon in 2009 and will continue deliveries through 2010. Saft has already delivered more than 1,500 batteries for ITAS under previous contracts with Raytheon.

Saft's rechargeable 28 V battery systems will power the surveillance, target acquisition and fire control system for the ITAS system. Saft's high-energy VLE series cylindrical cells provide sophisticated electronic control systems and health monitoring software. Raytheon selected Saft's 28 V battery systems in 2004, to replace the previous silver-zinc technology, resulting in numerous advantages including faster recharging capabilities, increased run-time and a longer life cycle.

Constructed using Saft's VL 52E cells, the maintenance-free 28 V Li-ion system can operate in extreme temperatures and provide a high energy density at a low life cycle cost. The high-power Li-ion system also includes human-to-machine interface, embedded management software and multiple safety features such as electronic protection and thermal fuses to prevent against charger fault and abuse from operating conditions.

EaglePicher Supplies Lithium-Ion Battery To NSS-9 Telecommunications Satellite

EaglePicher Technologies, LLC, an EaglePicher company and producer of batteries and energetic devices for the defense, space and commercial industries, is supplying two nine-cell Lithium-ion (Li-ion) batteries to Orbital Science Corp in support of SES NEW SKIES NSS-9 telecommunications satellite. The satellite launched from Kourou, French Guiana, on February 13.

EaglePicher's 100AH GS Yuasa cell batteries will power the satellite during eclipse with an operational mission life of 15 years. The NSS-9 carries 28 active C-band transponders and features three beams that can be interconnected on a transponder-by-transponder basis. It will be positioned at the orbital location of 183° East Longitude.

"We are proud to provide our high-energy Li-ion battery technology to the NSS-9 satellite program," said Randy Moore, president of EaglePicher Technologies. "This latest contract with OSC is further testament to the reliability and quality of EaglePicher products."

Lithium-ion cells provide energy storage at a third of the weight of traditional nickel based systems with excellent cycle life. EaglePicher's Li-ion batteries use a unique combination of light weight aluminum components and adhesive RTV, an elastomer sealant that minimize battery weight even further.

Frost & Sullivan Continued from Page 17

manufacturer. The success and failure of a PHEV largely depends on its batteries as the battery pack is the key element reducing the usage of gas in this vehicle. Hence, the development and availability of the most suitable batteries lead to the success of PHEVs that could reduce the use of gas to a large extent.

This package is likely to make PHEVs more affordable for the expected launch in 2010. Through the grants to battery manufacturers and automobile makers, the cost of manufacturing these vehicles becomes lower; consumers find it more affordable with the tax credits offered. The use of PHEVs ensures consumers that they are creating less pollution compared to their conventional vehicles.

Argonne National Laboratory (Argonne) is a significant participant in the DOE's PHEV energy storage research and development (R&D) center. The existence of this laboratory is to evaluate lithium-ion batteries of various manufacturers and develop the most suitable one for PHEVs. Argonne works with EnerDel, Inc. to evaluate and develop the most suitable battery for PHEVs. The lithium titanate battery, which is efficient to power HEV, is developed through the collaborative R&D efforts of Argonne and EnerDel, Inc. Similarly, Argonne also tests and evaluates batteries from other major manufacturers such as A123Systems and GS Yuasa. Presence of such a well-established laboratory with all facilities to efficiently evaluate batteries for PHEVs is a commendable effort from the government to promote the most efficient and suitable battery for PHEVs. From the consumer's side, non-profit organizations such as Plug In America play a major role in promoting the usage of PHEVs among consumers. Thus, the efforts and initiatives to use PHEVs on a large scale are encouraged by the government, and the launch of PHEVs is eagerly awaited by consumers. The stimulus package has sparked this trend even further. All signs indicate a strong market for PHEVs in a couple of years from its launch, which could supplement the revival of the US automobile industry, and thus aid in the revitalization of the US economy. With the initiatives taken by President Obama, PHEVs may be the most commonly seen vehicle on the road in the next couple of years.

For more information regarding this article, please contact Johanna Haynes at johanna.haynes@frost.com.

Infinite Power Solutions Achieves Discharge Capacity Breakthrough with Its Solid-State, Rechargeable, Micro-Energy Storage Technology

Infinite Power Solutions, Inc. (IPS) has reached a major breakthrough by achieving in excess of 3.0 mAh of discharge capacity (exceeding 12 mWh/~43 Joules of energy) within a single cell of its thin-film micro-energy storage technology. Based on initial tests, this equates to 60 times more capacity than other solid-state, rechargeable thin-film batteries (TFBs) available today. This significant energy density improvement was achieved in an extremely thin and compact footprint, roughly the size of a US postage stamp (25.4 mm by 25.4 mm by 0.17 mm). This breakthrough represents another milestone in the company's mission to redefine micro energy storage, while also highlighting IPS' ability to extend its core thin-film micro-energy cell (MEC) technology with significant capacity gains. Having recently begun pre-production activities for its standard MEC products, IPS is already demonstrating that it will be pursuing an aggressive technology roadmap aimed at continually enhancing the solutions it delivers to customers worldwide.

"Our early-access customers are already taking delivery of our MEC standard products, which deliver indus-

try-leading performance," said Dr. Bernd Neudecker, IPS' chief technology officer. "This breakthrough translates directly to achieving even greater performance advantages in future products, as we progress along an aggressive technology roadmap. In addition, we achieved this profound capacity gain by extending our core technology, which is already in commercial pre-production, demonstrating we can continue to meet our customer's future requirements."

This high capacity benchmark was achieved by optimizing the lithium cobalt oxide layer deposition using a state-of-the-art physical vapor deposition (PVD) process. While commonly referred to within the industry as a thin-film battery, IPS' thin-film MEC technology is truly unique and represents a new class of energy storage device. These MECs are well for remote, permanently powered micro-electronics compared to traditional rechargeable micro-batteries and capacitors. Moreover, IPS' technology is ideally suited for use with all forms of ambient energy harvesting techniques for recharging, such as solar, thermal, RF, magnetic and vibration energy, delivering a safe, reusable and clean power source that will last the lifetime of today's electronic devices and systems.

Nano-Terra, Inc. and Exide Technologies Collaborate on Innovative Energy Storage Solutions

Nano-Terra, Inc. has announced an alliance with Exide Technologies. Nano-Terra will use its expertise in surface chemistry and surface engineering to create a number of innovative functionalities for stored energy solutions manufactured by Exide for motive power, network power and transportation applications. Further, the

alliance is expected to provide Exide Technologies the opportunity to improve both the efficiency and competitiveness of its product portfolio.

The solutions under development in this collaboration are based on the surface engineering methods pioneered by Nano-Terra and its Co-Founder, Professor George M. Whitesides of Harvard University.

"As the world moves toward the development of increasingly more efficient energy technologies, we look forward to working with Exide to bring about significant improvements in energy storage through our nanotechnology portfolio and expertise," said Myer Berlow, CEO of Nano-Terra. "Exide has a long tradition of being on the cutting edge of new technology advancements, and we are very pleased that the Company recognizes the important role that nanotechnology can play in this arena."

The two companies will collaborate on product development at Nano-Terra's lab facilities in Cambridge, Mass. Both Nano-Terra and Exide currently anticipate that the first new product solutions will be presented to customers by 2011.

"A growing global interest in advanced lead-acid chemistries and alternate energy sources is driving our development into new products and technologies that will shape the energy storage systems of tomorrow," said Dr. Paul Cheeseman, vice president, Global Engineering and Research for Exide Technologies. "Exide is one of the world's largest producers and recyclers of lead-acid batteries and the first in our industry to collaborate with Nano-Terra. This strong collaboration will allow our Company to draw upon unique nanotechnology resources to implement innovative energy solutions for the global marketplace."

MTI Micro Signs Collaboration Agreement with a Leading OEM of Portable Chargers

MTI MicroFuel Cells, Inc. (MTI Micro) the developer of Mobion off-the-grid portable power solutions and a subsidiary of Mechanical Technology, Inc. (MTI), have entered into a collaboration agreement with a US-based OEM of universal chargers to evaluate Mobion prototypes.

In conjunction with this agreement, MTI Micro has delivered Mobion external charger prototypes to the OEM and together will be collaborating to evaluate the prototypes for inclusion with some of the OEMs product offerings. The compact-size charger built to fit in the palm of a hand generates its own energy by converting a clean, renewable fuel called methanol to usable electricity. With its removable cartridge, users can easily swap the depleted cartridge for a fresh one. Each cartridge boasts a high energy density that is capable of charging a typical mobile phone for up to 10 times or an energy equivalent to 17 pieces of AA Alkaline batteries.

"Working with an OEM who has deep expertise and an impressive reputation in the portable charger business provides us information to what the consumers need. In addition, this will provide us with the potential to access the worldwide charger market," said Peng Lim, CEO of MTI. "This is yet another step in our planned commercialization process, bringing us closer to our goal of making Mobion a standard power source for powering all types of mobile products."

BATTERY POWER 2009

October 20-21 • Denver



Battery Power 2009, an international conference highlighting the latest developments and technologies in the battery industry, will be held October 20-21 in Denver, Colorado.

This seventh annual event will feature more than 30 presentations on portable, stationary and electric vehicle battery technology, as well as battery manufacturing, materials and research & development. Topics will include new battery designs, emerging technologies, battery materials, power management, charging and testing systems, battery health, as well as the latest market trends affecting the industry.

The conference is designed for OEM design engineers, system engineers, technical and management professionals involved in battery powered products and systems, battery manufacturing, battery technology research and development and power management technology.

- Discover How New Technology is Impacting Power Management
- Network with Potential Business Partners
- Attend Exceptional Pre-Conference Activities
- See the Latest Products and Technologies Unveiled
- Learn to Optimize Your System Performance and Dependability
- Discuss Your Specific System Needs with Technology Experts
- Improve System Longevity and Power Delivery
- Maximize Return on Battery Technology System Investments

www.BatteryPowerOnline.com

Don't let Technology pass you by.



Testing Instrumentation

for Your Battery and Ultra-capacitor Needs



Battery & Ultra-capacitor Testers

- Automated Multi-Channel Testing Systems for Battery, Supercapacitor, and more...
- INDUSTRY LEADING Customer Support
- Logical, Powerful, and Easy to Use Control Software
- Multiple Current and Voltage Ranges for Improved Accuracy
- Linear Bipolar, Linear Unipolar, and PWM Circuitry Available to Cover a Wide Range of Applications
- Multi-Channel Potentiostat/Galvanostat Circuitry for Combinatorial Electrochemistry
- Flexibility Allows for General Cycling or Advance Electrochemical Experimentation
- Vast Experience in Multiple Markets from Advanced R&D to Manufacturing




Serving All of Your Testing Needs

www.arbin.com

Phone: 979-690-2751 Fax: 979-690-2761 Email: info@arbin.com

New High-Energy Cathode Material can Significantly Increase Safety and Life of Lithium Batteries

A close international collaboration of researchers led by the US Department of Energy's (DOE) Argonne National Laboratory and Hanyang University in South Korea have developed a new high-energy cathode material that is capable of greatly increasing the safety and extending the life-span of future lithium batteries.

Developing a very high-energy system with a long calendar and cycle life and excellent abuse tolerance are important challenges that lithium battery developers are working on to meet the energy storage needs of the light-duty vehicle market and to help achieve President Obama's goal of putting more than one-million plug-in hybrid electric vehicles (PHEV) on the road by 2015.

"The new high-energy material that we developed makes up a new class of oxide materials in which the composition of each particle is changing from the bulk to the outer layer," said Khalil Amine, manager of the advanced battery technology group at Argonne and the project's co-principal investigator. "Typically most oxide cathodes have a uniform composition throughout each particle, and offer low capacity and high surface reactivity with the electrolyte," he said.

The transitional nature of this new class of oxide material's composition gives it greater functionality. "The basic idea behind our novel approach is to design a particle

that has a very high-energy composition at the bulk and an outer layer composition that is very stable against any reactivity with electrolyte," Amine said. "Those two design features will be able to improve significantly the life and safety of lithium battery materials while offering very high-energy characteristics for possible use in PHEVs."

The material has also demonstrated a very high-power capability, said Yank-Kook Sun, co-PI and a professor in the Department of Chemical Engineering at Hanyang University. "We are able to charge the material to 4.3 and 4.4 volts and attain a very high-capacity of more than 210 milliampere hours per gram, with good power capability," he said. "Conventional cathodes have a capacity of 140 to 160 mAh/g," Sun added.

The DOE Office of Vehicles Technologies funded this research. Argonne has a major role in working with the DOE Office of Vehicle Technologies to develop advanced anode and cathode materials and improve lithium-ion battery technologies for transportation applications.

Emerging Applications Charge Up Thin Battery Market: Lux Research Predicts 55 Percent CAGR Will Power Market to \$259 Million by 2014

As much as 10 times thinner than incumbent coin cell batteries and often constructed from flexible materials, thin battery technologies are introducing disruptive new design options for conventional energy storage applications. Coin cells will remain the dominant technology for many uses, but emerging applications will provide thin batteries enough juice to grow from a \$19 million market in 2008 to a market of more than \$250 million in 2014.

With a diversity of technologies vying for dominance, the thin battery market is currently up for grabs. But while some battery platforms are quickly advancing, the window of opportunity is closing for others, according to the latest report from Lux Research. Titled "Thin Batteries: Novel Storage Powering Novel Devices," the report offers strategic guidance for investors and corporate tacticians who wish to gain an early edge in the market.

"The absolute numbers for the thin battery market aren't huge compared to coin cells, but the potential rate of growth spells opportunity for companies looking to buy early into the market," said Jacob Grose, an analyst at Lux Research and the report's lead author. "Investors and financiers, meanwhile, may find potential profits through late-stage funding for thin battery companies that have largely resolved their technological issues."

The report updates Lux Research's analysis of eight thin battery manufacturers and draws on nine additional interviews with application developers downstream to assemble a comprehensive perspective on thin battery technologies, companies and markets.

"By 2014, there simply won't be enough space in this market for 10 thin battery companies to sustain a healthy business," said Grose. "Anyone interested in getting a seat at the table will need to identify the winners, and identify them early."


"Thin Batteries: Novel Storage Powering Novel Devices" is part of Lux Research's Alternative Power and Energy Storage Intelligence Service. Clients subscribing to this service receive continuous research on the industry, as well as market trends and forecasts, ongoing technology scouting reports and proprietary data points in the weekly Lux Research Alternative Power and Energy Storage Journal, and on-demand inquiry with Lux Research analysts.

July 13-16, 2009 | San Diego, CA

STORAGE WEEK

- 1 Policy, Market Design & Business Models
- 2 Technology & Investing Outlook
- 3 Storage at the 'Edge'

Sponsors:



To Register
 Visit: www.infocastinc.com Call: (818) 888-4444
 Email: mail@infocastinc.com Fax: (818) 888-4440

Reach a Targeted Audience with Battery Power's New Line of Web Seminar Services

Battery Power Products & Technology now offers relevant, insightful web-based discussions on the latest technical advancements best practices, products and services, as well as safety, training and maintenance courses for batteries, battery systems, charging, testing, battery manufacturing and power management systems.

With the new web seminar capability, you will be able to produce and sponsor your own web seminar through Battery Power Magazine. You will have the ability to reach and engage targeted attendees from organizations worldwide. Our extensive range of industry publications and databases, enable us to market to your defined audience.

For more information on hosting a Webinar, please contact Shannon Given at shannon@infowebcom.com or Jeremy Fleming at jeremyf@infowebcom.com.

The 9th International Advanced Automotive Battery & EC Capacitor Conference

AABC

June 8-12, 2009 Long Beach, California

Where automotive energy storage developers, their suppliers and prospective customers meet to discuss the latest technological progress and market direction.

• Panel Sessions (papers by evolution) • Posters • Tutorials • Exhibits

5th International Symposium on Large Lithium Ion Battery Technology and Application (LLIBTA)
 June 8-10, 2009

The high-power Li-ion battery market is emerging. Join us to review the progress and assess the challenges for Li-ion batteries in high-power applications.

5th International Symposium on Large EC Capacitor Technology and Application (ECCAP)
 June 8-10, 2009

As current designs are evaluated in micro-hybrid vehicles and in wind turbines and locomotives, progress in materials and cell design is used to enhance cell performance.

9th International Advanced Automotive Battery & EC Capacitor Conference (AABC)
 June 10-12, 2009

HEV market expansion is occurring in parallel with a re-evaluation of the optimal hybrid-vehicle architectures and the most promising energy-storage solutions for each of them.



ADVANCED AUTOMOTIVE BATTERIES
 Tel: 530 692 0140 • Fax: 530 692 0142
 E-mail: info@advancedautobat.com
 For updated information about AABC & Symposia, please visit our website:
www.advancedautobat.com

AABC, LLIBTA, & ECCAP are organized by: **ADVANCED AUTOMOTIVE BATTERIES**

Index of Advertisers

Alpha Technologies	16	www.alpha.com	IXYS Corp.	17	www.ixyssolar.com
Applied Electronics Lab.	7	www.batteryformation.com	Keystone Electronics Corp.	11	www.keyelco.com
Arbin Instruments.	19	www.arbin.com	PowerGenix.	8	www.powergenix.com
Battery Solutions.	21	www.batteryrecycling.com	Pred Materials International Inc.	5	www.predmaterials.com
Bio-Logic USA LLC.	15	www.bio-logic.us	Reed Exhibitions Japan Ltd.	13	www.batteryjapan.jp/en
Dantona Industries.	2	www.dantona.com	Sanyo Energy USA Corp.	12	www.sanyobatteries.com
Data Translation.	6	www.datatranslation.com	Storage Battery Systems.	23	www.sbsbattery.com
EVE Battery.	17	www.evebattery.com	Trojan Battery Company.	9	www.trojanbattery.com
Henkel Corp.	15	www.henkelna.com	Webcom Communications	12, 16, 19, 20, 21	www.infowebcom.com
Hioki USA Corp.	24	www.hiokiusa.com	Yasui Seiki Co.	21	www.yasui.com
Hoppecke Batteries.	10	www.hoppecke-us.com			

Calendar of Events

April

- 13-17 - MRS Spring, San Francisco, Calif.
- 27-29 - **Battcon 2009**, Orlando, Fla.
- 29-1 - **ENTELEC**, Houston, Texas

May

- 3-6 - **Battery Council International**, Las Vegas, Nev.
- 12-14 - **EDS 2009**, Las Vegas, Nev.
- 24-25 - **2009 Electrochemical Society Annual Spring Meeting**, San Francisco, Calif.

June

- 1-4 - **UTC Telecom**, Las Vegas, Nev.
- 8-9 - **Advanced Automotive Battery Conference 2009**, Long Beach, Calif.
- 8-11 - **SuperComm 2009**, Chicago, Ill.

August

- 16-20 - **APCO**, Las Vegas, Nev.

October

- 20-21 - **Battery Power 2009**, Denver, Colo.

Send Calendar of Event Items to
Shannon Given at
ShannonG@infowebcom.com

Battery Recycling!

All types of batteries recycled.
Responsible, Environmentally Friendly,
Call **Battery Solutions, Inc.** Today!
248-446-3001 Fax 248-446-1927
service@batteryrecycling.com
www.batteryrecycling.com



Yasui Seiki Co.,(USA)

Lab Services: Electrode Coating, Patch Coating, Tape casting, Fuel Cell Coatings, Adhesion Primer Coating, all from 1 micron to 200+ microns thickness. Locations in Indiana-USA, Kanagawa-Japan and Nagasaki-Japan.

Custom Equipment: Slurry preparation, Coating/Casting Machines, Lamination, Calendaring, and Slitting equipment. Highest quality production is with our technology and machines.

See Website Tel 812.331.0700 ♦ Fax 812.331.2800
www.yasui.com ♦ coating@yasui.com

Free Subscription Application

Complete form and fax to 720-528-3771 or submit online at www.BatteryPowerOnline.com

Do you wish to receive Battery Power Products & Technology Magazine Free of Charge? (Outside US \$72) Yes No

Please select your desired format (check only one): Electronic Copy Hard Copy

X Signature (required) _____ Date _____

Print Name _____

Title _____

Company _____

Address _____

City _____ State _____ ZIP _____

Business Phone _____ Business Fax _____

E-mail (required for electronic format) _____

You may receive renewal reminders via email. If you do not want to receive other business related, third party email offers, please check here.

- | | | | |
|---|---|---|---|
| A. Primary product or service? (Check one) | <input type="checkbox"/> 1 Consumer electronics & power tools | <input type="checkbox"/> 6 Aerospace/aviation products | <input type="checkbox"/> 14 Batteries |
| | <input type="checkbox"/> 2 Communications systems & equipment | <input type="checkbox"/> 7 Medical Equipment | <input type="checkbox"/> 15 Battery assemblies |
| | <input type="checkbox"/> 3 Wireless products | <input type="checkbox"/> 8 Test & measurement equipment | <input type="checkbox"/> 16 Distributor of batteries/components |
| | <input type="checkbox"/> 4 Computers/peripherals | <input type="checkbox"/> 9 Military products | <input type="checkbox"/> 17 Chargers |
| | <input type="checkbox"/> 5 Automotive | <input type="checkbox"/> 10 Industrial power/utility | <input type="checkbox"/> 19 Power management ICs |
| | <input type="checkbox"/> 11 Electrical Power/Utility | <input type="checkbox"/> 21 Technical/engineering consulting firm | |
| | <input type="checkbox"/> 12 Security | | |
| B. Principal job function? (Check one) | <input type="checkbox"/> 23 Design/development engineering (including mgmt) | <input type="checkbox"/> 26 Engineering services | |
| | <input type="checkbox"/> 24 Industrial power supply engineering/operations | <input type="checkbox"/> 27 Research & development | |
| | <input type="checkbox"/> 25 Manufacturing/production/testing | <input type="checkbox"/> 28 Corporate management | |
| | | <input type="checkbox"/> 29 Purchasing/procurement | |
| | | <input type="checkbox"/> 30 Marketing/Sales | |
| | | <input type="checkbox"/> 31 Engineering consulting | |

MIT Battery Material Could Lead To Rapid Recharging of Many Devices

MIT engineers have created a kind of beltway that allows for the rapid transit of electrical energy through a well-known battery material, an advance that could usher in smaller, lighter batteries for cell phones and other devices that could recharge in seconds rather than hours. The work could also allow for the quick recharging of batteries in electric cars, although that particular application would be limited by the amount of power available to a homeowner through the electric grid.

The work is being led by Gerbrand Ceder, the Richard P. Simmons Professor of Materials Science and Engineering. Because the material involved is not new, the researchers have simply changed the way they make it. Ceder believes the work could make it into the marketplace within two to three years.

State-of-the-art lithium rechargeable batteries have very high energy densities; they are good at storing large amounts of charge. The tradeoff is that they have relatively

slow power rates; they are sluggish at gaining and discharging that energy. Consider current batteries for electric cars.

"They have a lot of energy, so you can drive at 55 mph for a long time, but the power is low. You can't accelerate quickly," Ceder said.

Why the slow power rates?

Traditionally, scientists have thought that the lithium ions responsible, along with electrons, for carrying charge across the battery simply move too slowly through the material.



A sample of the MIT battery material that could allow quick charging of portable devices. Photo courtesy of Donna Coveney/MIT.

About five years ago, however, Ceder and colleagues made a surprising discovery. Computer calculations of a well-known battery material, lithium iron phosphate, predicted that the material's lithium ions should actually be moving extremely quickly.

"If transport of the lithium ions was so fast, something else had to be the problem," Ceder said.

Further calculations showed that lithium ions can indeed move very quickly into the material but only through tunnels accessed from the surface. If a lithium ion at the surface is directly in front of a tunnel entrance, there's no problem: it proceeds efficiently into the tunnel. But if the ion isn't directly in front, it is prevented from reaching the tunnel entrance



Scanning electron micrograph of a particle of the MIT battery material reported in Nature. Dark area indicates the inside of the particle surrounded by a lighter surface layer only five nanometers wide. Photo Courtesy of Ceder Lab/MIT.

because it cannot move to access that entrance.

Ceder and Byoungwoo Kang, a graduate student in materials science and engineering, devised a way around the problem by creating a new surface structure that does allow the lithium ions to move quickly around the outside of the material, much like a beltway around a city. When an ion traveling along this beltway reaches a tunnel, it is instantly diverted into it. Kang is a coauthor of the Nature paper.

Using their new processing technique, the two went on to make a small battery that could be fully charged or discharged in 10 to 20 seconds (it takes six minutes to fully charge or discharge a cell made from the unprocessed material).

Ceder said that further tests showed that unlike other battery materials, the new material does not degrade as much when repeatedly charged and recharged. This could lead to smaller, lighter batteries, because less material is needed for the same result.

"The ability to charge and discharge batteries in a matter of seconds rather than hours may open up new technological applications and induce lifestyle changes," Ceder and Kang conclude.

This work was supported by the National Science Foundation through the Materials Research Science and Engineering Centers program and the Batteries for Advanced Transportation Program of the US Department of Energy. It has been licensed by two companies.

The 2009 Conference will have more events and new features—at 2008 Prices!

PRICE FREEZE

Prepare For Your Bright Future

During the Conference's four days:

- Learn new skills at more than 90 educational sessions.
- Explore cutting-edge products and services from more than 350 companies.
- Connect with other public safety communications officials at networking events like the Welcome Reception, the new Distinguished Achiever's Breakfast, new Exhibit Hall Lunch, and the Blue & White Gala.
- Hear from prominent and inspirational Keynote Speakers.
- Help us kick off the association's 75th Anniversary!

The APCO International Annual Conference presents the industry's best educational and product offerings combined with new innovative features such as online Conference on Demand and a host of new events!

A Bright Future.

A Past of Distinguished Service.

APCO
75TH ANNUAL CONFERENCE & EXPO
2009

Las Vegas, NV
Las Vegas Convention Center
August 16-20, 2009

Register now at
www.apco2009.org

Join the conversation on the APCO Events Blog & Twitter at:
www.apcoeventsblog.org and twitter.com/APCOConference

APCO INTERNATIONAL 75TH DIAMOND ANNIVERSARY



SBS®

STORAGE BATTERY SYSTEMS, INC.

Providing Power Solutions™ Since 1915



**INNOVATIVE TECHNOLOGY FOR EMERGENCY
POWER / BATTERY DIAGNOSIS & MONITORING.
EXCLUSIVELY FROM SBS.**



SBS-IBEX Battery Diagnostic Tester

SBS-IBEX Tests:

- Internal Resistance (mΩ)
- Conductance (Seimens)
- Voltage (V)
- Internal Temperature (°C)

Exmons Multi User Battery Management Software



The SBS-IBEX is a cutting edge digital battery diagnostic tester that meets all IEEE Standards. Recommended for all stationary applications such as telecom back up power, utility switching power, uninterruptable power systems (UPS) and more! The SBS-IBEX is the only diagnostic tester to provide accurate test results utilizing the world's first ripple-removing algorithm (KR PAT No. 0494489) within 4 seconds or less while the system is on-line. Comes complete with the worlds best battery management software (Exmons)!



SBS-2500 Digital Hydrometer

Test Specific Gravity of Lead-Acid & Ni-Cad Batteries

- Measure Specific Gravity & Temperature
- Accuracy (to 99.999%)
- Data Storage & Downloading Capabilities
- Speed (5x faster conventional methods)
- Merge Data w/ SBS-IBEX Results In Custom Excel Spread Sheet

SAVE TIME & MONEY.

SBS GIVES YOU THE EDGE.

SBS provides the fastest delivery times, typically less than a week, from our multi-million dollar inventory of Batteries, Chargers, Racks, Spill Containment Systems, Enclosures, Testing Equipment & More. Combined with the highest quality products and superior customer service SBS gives you the edge.

Visit us at www.sbsbattery.com

1-800-554-2243

Call Monday - Friday, 8am-5pm CST

Diagnose A Problem Before It Begins



starting at **\$2,495**
at



60VDC
maximum
between
terminals

3554 Battery HiTester

- 60 Volt Range
- Auto-hold & Auto-Data Storage
- Enhanced resistance against UPS noise
- Store up to 4800 sets of data
- USB PC Interface
- Data management PC software



3197 Power Quality Analyzer

Measures:

- Power & Power Factor
- Active/Reactive Energy
- Demand kWh
- Load Changes (graph display)
- Transient voltage/Inrush current



3453 Digital MΩ HiTester

- Efficient Insulation Measurement
- 125 V/40 M, 250 V/2000 M, 500 V/2000 M, 1000 V/4000 M
 - Backlit Digital Display
 - Built-in memory
 - Auto discharge



3454-11 Digital MΩ HiTester

Insulation Resistance Tester

- 250 V DC/500 V DC/1000 V DC
- Comparator function
- AC Voltage up to 750V
- Built-in safety cover
- Auto discharge



3455-01 High Voltage HiTester

5KV Compact Performance

- Test Voltage 250V to 5kV
- Measure insulation of high voltage equipment up to 5T Ω
- Auto Calculate & Display PI and DAR
- Data Storage & USB Interface

Producing High Quality Products For 75 Years

HIOKI

6 CORPORATE DRIVE • CRANBURY, NJ
PHONE: 609.409-9109
FAX: 609.409-9108
www.hiokiusa.com



ISO 14001
FOR A
CLEAN
ENVIRONMENT

"we're doing our part"