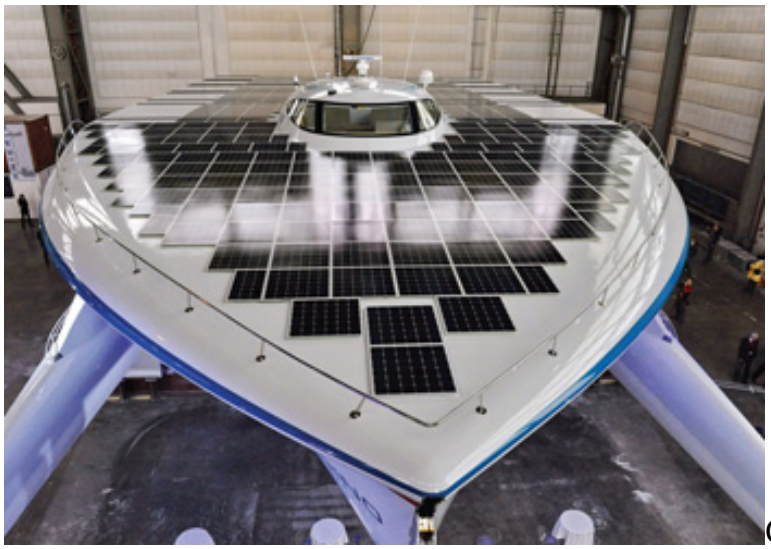
The World’s Largest Solar-powered Boat, Producing Lithium Battery Materials Cheaper

compiled by Chris Warner

With summer vacation season in the rear view mirror, here’s a collection of news items from the last couple of weeks.

In 1873, Jules Verne showed how steam power made it possible to go “Around the World In 80 Days.” In 2011, PlanetSolar, along with industrial PC technology from WAGO Corporation, plan to circumnavigate the globe in 140 days via solar power with Tûranor – the world’s largest solar-powered boat.



Conceived by Raphaël Domjan, a Swiss eco-adventurer and PlanetSolar founder, Tûranor is a catamaran research vessel for solar power utilization. Tûranor will embark on a solar-powered 2011 worldwide tour, with planned stops in San Francisco and New York City. According to PlanetSolar, the 2011 tour will be the first solar-powered circumnavigation by any means of transport.

Gleaming with 500+ sq. meters of photovoltaic panels and packing 11 tons of batteries (with chassis), including the 388 V lithium ion (NCA) battery, Tûranor is a showcase for solar power advancements and sustainable transport. To support the multi-hull ship’s planned average speed of 7.5 knots over 31,069 miles and 140 days, WAGO supplied three 758 Series IPCs with control functionality and electrical components.

WAGO IPCs control charging for three batteries and ten Drivetek Maximum Power Pick Trackers (MPPT) via 13 CAN buscouplers. These high-end DC/DC converters improve the PV panels’ solar absorption — vital for the fixed, deck-mounted PV panels. This also helps ensure safety for the four-member crew as Tûranor has no gasoline backups for steering/propulsion. WAGO’s electrical components feature vibration- and thermal cycling-resistant, gas-tight connections for reliability in harsh marine environments.

Microwave Process Produces Lithium Battery Materials Cheaper, Faster

Lithium batteries are playing a central role in the new energy economy, powering everything from cell phones to electric cars. New research shows that pricey lithium battery materials can be produced cheaper and faster using industrial microwave furnace systems.

Spheric Technologies, a Phoenix, Arizona, high temperature microwave technology innovator, has developed a time- and cost-saving production process for a key cathode material utilized in lithium ion batteries -- lithium ferro phosphate (LFP). The Spheric process uses unique precursors and applies microwave in the drying and synthesis stages. This yields a phase pure product requiring little, if any, refinement, eliminating costly refining required by other processes. Microwave reduces production time from more than 10 hours (with conventional systems) to 30 minutes, producing significant savings in energy consumption, equipment utilization and cost.

Spheric Technologies has filed two patent applications covering microwave techniques, material and technology for the synthesis of lithium ion battery materials.

The company's AMPS microwave furnace is ideally configured for the production of LFP, among other applications. Spheric will market the furnace with a license for the patent-pending lithium battery material production technology.

Earlier this year, researchers reported at the American Ceramic Society conference on The Material Challenges in Alternative and Renewable Energy that microwave techniques and advanced microwave furnaces capable of processing commercial volumes of lithium battery materials are now available in the U.S. "These systems [from Spheric Technologies] offer the opportunity of scaling up developmental results to commercially viable production levels," the researchers said. Lithium-ion battery materials LFP and LTO (lithium ferro phosphate and lithium titanate) have been successfully synthesized in a larger advanced microwave system supplied by Spheric Technologies.

Lead author on the research, Karl Cherian, Ph.D., said that while most microwave-assisted LFP synthesis has involved laboratory systems, the availability of advanced larger scale batch and continuous high temperature microwave systems opens the door to full-scale commercial production.

Imec Reports Large-area Silicon Solar Cells with High Efficiency

At the 25th European Photovoltaic Solar Energy Conference (Valencia, Spain), imec presented several large-area silicon solar cells with a conversion efficiency above 19 percent. Two types of cells were realized namely with Ag-screenprinted contacts and plated Cu-contacts. Efficiencies of cells with screenprinted contacts were up to 19.1 percent whereas 19.4 percent was obtained with Cu-plated contacts. These high efficiencies were obtained thanks to several factors amongst which a

combination of improved texturization and optimized firing conditions. The results were achieved on large-area cells (148cm2) with 170µm thickness, proving the industrial viability of the process.
Imec’s record efficiency silicon solar cells feature rear-side passivation, laser ablation and, local aluminum back-side field and screenprinted contacts or Cu-plated contacts on advanced emitter schemes. “The fact that such efficiencies can be obtained by metallization schemes based on screenprinted Ag contacts enables compatibility with present industrial metallization practice in the solar cell industry. The Cu-based front-side metallization is a step towards higher sustainability and lower cost, substituting Ag with Cu in future industrial production of crystalline silicon solar cells;” said Dr. Joachim John, team manager industrial solar cells at imec.
The results were achieved within imec’s silicon solar cell industrial affiliation program (IIAP), a multi-partner R&D program that explores and develops advanced process technologies aiming a sharp reduction in silicon use, whilst increasing cell efficiency and hence further lowering substantially the cost per Watt peak.

Energy Micro Wins Environmental Design Award

Energy Micro, the energy friendly microcontroller company, haswon the Enviromental Design Award at the UK's annual e-Legacy Awards. The award, made in recognition of the company's ultra low power EFM32 Gecko microcontroller, was presented to Energy Micro's Director of Sales EMEA Ian Fletcher at a prestigious ceremony held at the Roof Gardens, Kensington, London.

Energy Micro's EFM32 Gecko microcontroller family consumes a fraction of the energy required by other 8, 16 and 32-bit microcontroller solutions. The EFM32 Gecko microcontroller is in full production, and details of the software and pin-compatible Tiny Gecko and Giant Gecko products have also been announced. The Gecko microcontrollers are supported by the energyAware tool suite and a rapidly growing community of third party suppliers providing IDE/compilers, debug systems, development kits and real time operating systems.

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