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MARCH 12, 2015


**Breakthrough Technologies**

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**Breakthrough Technologies**

**Scaleup for a test facility to grow algae for biofuels**

The New Energy and Industrial Technology Development Organization (NEDO, Kawasaki; www.nedo.go.jp) and partners IHI Corp. (Tokyo; www.ihi.co.jp), Kobe University (www.kobe-u.ac.jp) and Neo-Morgan Laboratory Inc. (NML; Kawasaki, all Japan; www.neo-morgan.com) have completed construction on an outdoor test site with 1,500-m<sup>2</sup> of pond surface area for further development work on the production of biofuels (including jet fuel) from algae. [\[more\]](#)

**An electrochemical process to mimic photosynthesis**

Photosynthesis is one of the best ways to convert carbon dioxide into renewable energy and at the same time, reduce the concentration of CO<sub>2</sub> in the atmosphere. In plants, there are two main steps in photosynthesis: First, water is split (via solar energy), generating a proton and releasing oxygen. The second step (Calvin cycle) is a dark reaction where CO<sub>2</sub> absorbed from the atmosphere is reduced to glucose. [\[more\]](#)

**Catalytic filter bags can slash investment costs for offgas treatment**

Last January, Haldrup Topsøe A/S (Lyngby; www.topsoe.com) and FLSmidth A/S (Copenhagen, both Denmark; www.flsmidth.com) began a joint, global effort to commercialize a new catalytic filter-bag technology, which the partners have developed over the past four years. Tradenamed EnviroTex, these filter bags are capable of reducing dust, volatile organic compounds (VOCs) and oxides of nitrogen (NOx) in a single, integrated process. [\[more\]](#)

**'Anode-less' lithium battery prototype doubles energy density**

A new prototype lithium battery with a very thin metal anode achieves an energy density of 1,200 W-h/L at room temperature — double that of conventional Li-ion batteries using graphite anodes. The prototype battery, developed by Massachusetts Institute of Technology (MIT; Cambridge, Mass.; www.mit.edu) spin-off SolidEnergy (Waltham, Mass.; www.solidenergysystems.com), uses a standard lithium-cobalt oxide (LCO) cathode with an ultrathin, two-layer, lithium-on-copper anode that allows larger energy density. [\[more\]](#)

**CO<sub>2</sub> capture with permeable polymer microcapsules**

A new type of CO<sub>2</sub>-capture media based on permeable polymer microcapsules has been developed by teams of scientists at Lawrence Livermore National Laboratory (Livermore, Calif.; www.llnl.gov), Harvard University (Cambridge, Mass.; www.harvard.edu) and the University of Illinois-Urbana-Champaign (www.illinois.edu). The materials have several advantages over amine-based approaches to absorbing CO<sub>2</sub> from power-plant fluegases. [\[more\]](#)

**This process enables magnesium alloy to be cast economically**

The New Energy and Industrial Technology Development Organization (NEDO; Kawasaki; www.nedo.go.jp) and Sankyo Taseyama Inc. (Takaoka, both Japan; www.st-grp.co.jp) have developed technology that enables the casting of small-diameter (500-100-mm dia.) magnesium alloy billets, which are suitable for direct, compact forging. [\[more\]](#)

**Standard 468x60**

**More Breakthrough Technologies**

- Scaleup for modular H<sub>2</sub> production via PEM electrolysis
- Carbon fibers enhance swine wastewater treatment
- Perfluorinated compounds may pose a risk to firefighters

**From Our Bookstore**

**Heat Recovery Steam Generators**

This PDF guidebook provides an introduction for all aspects of heat recovery steam generators (HRSG) engineering. Coverage ranges from market surveys, heat balances and mechanical design to operation of HRSGs. Both theory and practical applications are covered, giving engineers the proper guidance needed to design and operate HRSG power plants. The guidebook begins with a market review of HRSGs and includes an introduction of the balance of a plant, overall efficiency of steam and the gas turbine cycle. [\[more\]](#)

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