



## briefs

A new benchmark in the coupling of rebars was set by steel reinforcement specialist **Hy-Ten's**, UK, first ever friction welded coupler. The HT Welded Coupler offers enhanced structural performance, significant site productivity gains with additional material cost savings. Trials by the Certification Authority for Reinforcing Steel proved the strength of the weld after testing multiple samples to destruction. Ultimate failure was in the rebar and not the joint. [www.hy-ten.co.uk/](http://www.hy-ten.co.uk/)

Teams led by the **Institut Charles Sadron**, Strasbourg, France, introduced a new process to produce ultrathin coatings that is simple, versatile, and suitable for large-scale processes. One major improvement is the technique of spray-assisted deposition, in which atomized mists of solutions containing each of the two substances are sprayed on a surface in an alternating fashion. This accelerates the process and facilitates scaling up to industrial levels. [www-ics.u-strasbg.fr](http://www-ics.u-strasbg.fr).

**EOS**, Munich, Germany, introduced its metal and plastic laser-sintering systems at EuroMold 2010 in Frankfurt, Germany. The company offers a direct metal laser-sintering (DMLS) system, a new metal material (EOS nickel alloy IN625), and two new plastic materials: PA 2241 FR, a nonflammable material geared especially to aerospace; and PEBA 2301, a flexible plastic that, due to its special material properties, offers unlimited potential applications. [www.eos.de](http://www.eos.de).

# PROCESS TECHNOLOGY

## Novel fuel cell catalyst lowers need for precious metal

Researchers at University of Copenhagen, Denmark, are testing catalysts that do the actual work in fuel cells. One material is called "Core Shell catalyst" developed at Clarkson University, Potsdam, N.Y., for fuel-cell company Umicore, Belgium. The surface area of platinum in traditional fuel cells is maximized by grinding the precious metal into exceedingly small particles and suspending them in a frame of carbon. However, if the particles become too small, they lose their converting power and tend to clot together. Over time the carbon-frame burns away and leads to clotting. These scenarios make the particles lose surface area, and, thus, catalysts produce less current.

Larger spheres do not need the fragile carbon scaffold, and tend not to clot as badly, but they require much more platinum to make. The Umicore catalyst coats larger spheres of less precious metal with a thin skin of platinum to avoid clotting. The researchers concluded the large-sphere catalyst retains its full converting power and also produces the same amount of electricity as small particle models. But with bigger spheres, chances are that it will keep on producing at top capacity for a longer time. The next challenge is to recreate this with a less expensive material (in the current test, they used gold).

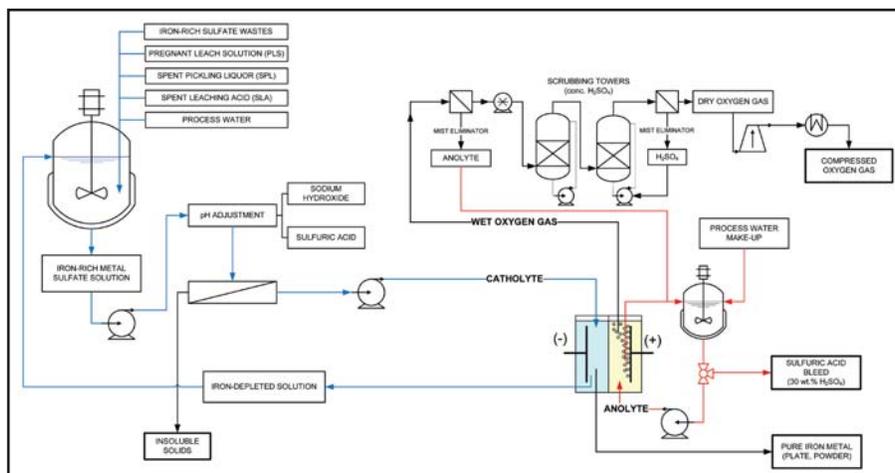
[www.chem.ku.dk](http://www.chem.ku.dk).

## Green process for electrowinning of iron and regenerating sulfuric acid

Electrochem Technologies & Materials, Montreal, Quebec, Canada, has developed an electrochemical technology that continuously electrolyzes an iron-rich sulfate solution inside a divided electrolyzer by means of an anion exchange membrane as separator, with a titanium cathode and a dimensionally stable anode. Upon electrolysis iron metal deposits onto the cathode while the concurrent regeneration of sulfuric acid and evolution of oxygen gas occur at the anode. Initially there is a 10% solution of sulfuric acid on the anode side. After electrolysis, the acid concentration reaches about 30%. Depending of the metallic impurities eventually present in the electrolyte either pure iron or an iron alloy can be produced.

The iron-rich metal sulfate solution may originate from various mining residues, metallurgical wastes, and industrial effluents by-produced in the mining, metallurgical, and chemical industries worldwide. Typical applications for this technology are for recycling the ferrous sulfate heptahydrate, also called copperas, or green vitriol, in the trade from the titanium white pigment industries, the spent pickling liquors (SPLs) originating from the iron and steel making industries, and the pregnant leach solutions (PLs) from the hydrometallurgical treatment by acid leaching of non ferrous metals.

[www.electrochem-technologies.com](http://www.electrochem-technologies.com); [www.francoiscardarelli.ca](http://www.francoiscardarelli.ca)



Cardarelli process flow diagram.