

PROCESS TECHNOLOGY



World's largest autoclave

ASC Process Systems announces the completion of the world's largest autoclave, which will cure the composite fuselage sections of the Boeing 787 Dreamliner. The autoclave will process composites to a maximum pressure of 150 psig at a maximum temperature of 232°C (450°F). Built for Vought Aircraft in Charleston, S.C., the working area is 30 feet by 75 feet, with a volume over 82,000 cubic feet. It weighs over 500 tons and was fabricated on site at the Vought Aircraft facility in South Carolina.

For more information: Lloyd Champion, ASC Process Systems, 14062 Balboa, Sylmar, CA 91342; tel: 818/833-0088; www.aschome.com.



Molten oxide electrolysis produces iron without emissions

An environmentally safe method of producing iron has reportedly been developed by engineers at the Massachusetts Institute of Technology. Molten oxide electrolysis (MOE) releases only oxygen as a byproduct, not the carbon-based gasses released by current smelting processes. MOE works by passing an electric current through a liquid solution of iron oxide. The iron oxide then breaks down into liquid iron and oxygen gas, allowing oxygen to be the main byproduct of the process.

The MOE process is predicted to increase productivity to at least five times that of aluminum, which is produced by a similar process. MIT will continue further experiments to determine how to increase the rate of iron production and to discover new materials capable of extending the life of certain reactor components to industrially practical limits. This work will set the stage for construction of a pilot-scale cell to further validate the viability of the MOE process and identify scale-up parameters.

For more information: Prof. Donald Sadoway, Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge, MA 02139-4307; tel: 617/253-3487; dsadoway@mit.edu; www.mit.edu.

BRIEFS

Alliant Techsystems

has received a five-year, \$22 million contract from the **U.S. Air Force Research Laboratory** to develop automated composite technologies to reduce the manufacturing costs and increase the performance of large composite launch vehicle structures. Work on the Large Automated Production of Expendable Launch Structures (LAPELS) contract will be done at ATK facilities in Clearfield, Utah, and Iuka, Mississippi. www.atk.com

The American Galvanizers Association

announces the 13th annual Excellence in Hot-Dip Galvanizing Awards. Projects submitted must have been galvanized by an AGA member, and construction must be completed during 2006. www.galvanizeit.org

Bodycote HIP North America and Dynamet Technology Inc.

have formed a strategic alliance that will enable the further commercialization by Dynamet to supply its powder metal titanium alloys and composites, and enable Bodycote to apply its expertise to the HIP of titanium powder metal products. www.dynamettechnology.com

Copper electrodes make 50,000 aluminum sheet welds

More than 50,000 high quality welds on automotive-grade aluminum sheet have been made by just one set of standard copper electrodes on an automated robotic welding system, according to researchers at the University of Warwick's Warwick Manufacturing Group in conjunction with Innoval Technology and engineers from Jaguar and Land Rover. The long electrode life was achieved by polishing the copper electrodes during the brief gap in time between each welded component.

Resistance spot welding is the most prevalent process for joining steel sheet in the automotive industry. However, a major hurdle preventing the adoption of this joining process for aluminum automotive sheet has been the problem of short electrode life and associated loss of weld quality.

For more information: Douglas Boomer, Innoval Technology Ltd., Oxfordshire, OX16 1TQ, UK; tel: 44 (0)1295 702800; fax: 44 (0)1295 702898/9; douglas.boomer@innovaltec.com; www.innovaltec.com.

Isothermal aluminum melting cuts energy required in half

An isothermal melting process (ITM) that needs only half the energy and produces half the emissions associated with conventional aluminum melting has been developed, says Apogee Technology, Verona, Pa. New materials and construction techniques for immersion heaters make ITM practical for large-scale aluminum operations. Today, most aluminum is melted in vibratory furnaces that burn natural gas or fuel oil. Radiant heating is the dominant heat transfer mechanism, but it has poor thermal efficiency at less than 30%.

On the other hand, conductive heat transfer from immersion heaters can provide thermal

Core Furnace Systems is to supply a complete melt shop material handling system to the new **Sever-Corr** mill in Lowndes County, Miss. The project includes and EAF/LMF flux charging and feed system and carbon injection system for EAF. These include conveyors, storage silos, bins, vibratory feeders, injection vessels, and unloading stations. www.corefurnace.com

Flow International Corp. announces that it has been awarded two military-related contracts to manufacture and install six-axis robotic ultrahigh-pressure waterjet composite cutting machine tool systems for the manufacture of composite armor protection systems. www.flowcorp.com

Pulsar announces the installation of its MPW 25 magnetic pulse welding systems at the TI Automotive production plant in Reynosa, Mexico. www.pulsar.co.il

Rutgers-Camden University has developed a new method for coating polymers. It is a pulsed laser deposition technique in which a high-power laser is focused onto a target material in a vacuum chamber, creating a plume of vaporized material. The laser is tuned to a specific vibrational mode of the polymer to ease the vaporization process and limit photochemical and photochemical damage. www.camden.rutgers.edu

Stratasys announces that **Dell Inc.** purchased the 6000th Stratasys rapid prototyping system. Dell installed an FDM Vantage SE in May at its Product Group in Austin, Texas. The RP system is to build functional, durable models from a variety of high-performance engineering materials, such as ABS, polycarbonate, and PC-ABS. www.stratasys.com

efficiencies as high as 97%, and it avoids detrimental combustion gas contact with aluminum. New materials and construction techniques allow immersion heaters to be built with high heat flux (approximately 70,000 Btu/hr-ft²) and external coatings that provide mechanical and chemical protection. These new heater designs are based on a highly conductive, impact-resistant ceramic coating on a metallic sheath and a highly thermally conductive, dielectric integral coupling medium between the sheath and the heat producing element.

ITM was developed by Apogee Technology Inc., Aleris International, General Motors, Drexel University, the University of Pittsburgh, and Argonne National Laboratory.

For more information: C. Edward Eckert, Apogee Technology Inc., Verona, PA 15147; tel: 412/795-8782; fax: 412/795-1004; apotecki@aol.com; www.apogeetechinc.com.

Metal infusion surface treatment makes nanostructure coatings

Metal Infusion Surface Treatment, known as MIST, can infuse up to 51 elements into the surface of metals and alloys, and then secures these elements with a thin nanostructure coating. The technology was developed by researchers from C3 International, assisted by staff from the Materials Science and Technology Division of Oak Ridge National Laboratory. Metalworking tools and catalytic devices treated by MIST have demonstrated increased lifetime or higher performance.

In tests on cutting tools, MIST has yielded lifetimes ten times better than conventional coatings, and 40 times for aluminum die casting tooling accessories. Customers report the treatment not only lengthens the life of the tool, but also increases production rates and reduces overall manufacturing costs.

The technology was a winner of a 2006 *R&D 100 Award*.

For more information: C3 International, 1370 Union Hill Industrial Court, Alpharetta, GA 30004; tel: 678/624-0230; www.cccintl.com.

Low-cost composite pultrusion method reduces costs by 90%

A simple low-tech pultrusion technique is now being adapted to lend its simplicity, efficiency, and cost savings to production of complex composite structures for high-performance military and commercial hardware, says Kazak Composites, Woburn, Mass.

The pultrusion process is completely automated; it starts with spools of dry fiber and/or fabric reinforcement, adds wet resin, then moves the material through a heated tool. The result is a continuously produced stream of low-cost, constant cross-section composite hardware that can be cut automatically to length at the end of the processing line. The pultruded composites can be reinforced with many fibers such as Kevlar, fiberglass, or carbon.

Kazak developed and advanced the technique with MDA Phase I and II SBIRs investigating strong, cost-effective carbon/epoxy missile canisters for the PAC-3 program, specifically to make very straight, large cross-section (up to 20 feet long) boxes. Kazak has also built larger "superscale" pultrusion machines, including the world's widest pultrusion equipment, optimized for making composite sandwich panels greater than ten feet wide and of unlimited length.

For more information: Dr. Jerome Fanucci, Kazak Composites Inc., 10-F Gill Street, Woburn, MA 01801; tel: 781/932-5667; www.kazakcomposites.com.

Deformation resistance welding partnership to enhance reliability

SpaceForm Inc., a Delphi spinoff company, and the Edison Welding Institute have announced that EWI will become SpaceForm's R&D development partner and actively participate in the commercialization and production scale-up activities of SpaceForm's Deformation Resistance Welding (DRW) technology. DRW forms near instantaneous, full strength, automated leak-tight welds. With DRW, designers can create lean structural assemblies of tubular components. Tubes may be joined to other tubes, sheets, or solids, optimizing cost and performance.

Together, SpaceForm and EWI plan to offer customized product development services to the automotive and manufacturing industries. Customers will utilize the extensive resources and staff of EWI to design and carry out feasibility, prototype, and validation studies. SpaceForm will provide customers with design services and commercial access to the technology, and will coordinate a central knowledge base that will benefit all.

For more information: Jayson Pankin, SpaceForm Technology, 440 Burroughs St., Detroit, MI 48202; tel: 248/813-8068; jaysonpankin@spaceformtech.com; www.spaceformtech.com.