

# BUSINESS TRENDS



## Manufactured goods trade deficit shrinks by 16%

The U.S. January manufactured goods trade deficit dropped by \$7 billion from the previous year, reports the U.S. Commerce Department. The report was hailed as validation that “export-led growth and free trade are continuing to hold the economy above water,” by Frank Vargo, the National Association of Manufacturers vice president for international economic affairs.

“While the overall U.S. trade deficit in January was \$4 billion larger than the same period last year, this was due to the continued growth in the petroleum trade deficit,” says Mr. Vargo. The January manufactured goods deficit was \$37 billion, compared to \$44 billion in January 2007, a 16% improvement over a year, with exports rising by 11% and imports growing by only 1%.

“The other real plus is our free trade agreements,” he said. “Together, our free trade partners accounted for nearly half of our exports, but only \$100 million of our \$37 billion January deficit – with notable trade balance improvements in NAFTA and CAFTA.” [www.nam.org](http://www.nam.org)

## Nanotube wires operate at speed of commercial chips

Carbon nanotubes designed to wire a silicon chip operating at speeds comparable to those of commercially available processors and memory have reportedly been built by electrical engineers at Stanford University, Stanford, Calif., and Toshiba, Japan.

“This is the first time anyone has been able to show digital signals going through carbon nanotubes at one gigahertz,” says Prof. H.-S. Philip Wong. The advance reported by the Stanford and Toshiba team shows that nanotubes are capable not only of connecting transistors at industrially relevant speeds, but also of doing so in today’s real circuits.

The silicon chip is an array of 256 circuits called “ring oscillators,” which are industry-standard circuits for testing the speed of chips. Including other control circuitry that allowed for selectively operating each of the 256 oscillators, the chip comprised a total of 11,000 transistors in an area one hundredth of a square inch.

**LAI International Inc.**, a strategic supplier of precision components and sub-assemblies for original equipment manufacturers, has signed a manufacturing contract to produce critically needed armor kits for mine-resistant ambush-protected military vehicles. LAI received the contract from the armor supplier for Navistar Defense LLC, which has received an award from the Pentagon for 4475 of its 21-foot-long MaxxPro MRAP vehicles. The armor kits are produced at LAI’s manufacturing facility in Maryland and shipped directly to Navistar’s International Military and Government assembly plant in West Point, Miss. [www.laico.com](http://www.laico.com)

The U.S. **National Research Council** examines the public-private effort to develop technologies for more fuel-efficient automobiles and to investigate the feasibility of hydrogen-based vehicles in its Review of the Research Program of the Freedomcar and Fuel Partnership, Second Report. The FreedomCAR (Cooperative Automotive Research) and Fuel Partnership — a research collaboration among the U.S. Department of Energy, the Detroit Three automakers, and five major energy companies — seeks to develop technology that will allow U.S. automakers to decide by 2015 whether hydrogen-powered vehicles could be manufactured on a large scale. [www.nas.edu](http://www.nas.edu)

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## Enzyme converts plant products to ethanol

A process in which large volumes of plant products from leftover brewer’s mash to paper trash are converted into ethanol and other biofuels has reportedly been developed by professors Steve Hutcheson and Ron Weiner at the University of Maryland, College Park. Called the Zymetis process, the technology produces biofuels from cellulosic sources such as waste paper, brewing byproducts, and leftover agriculture products such as straw and corncobs.

The secret is a Chesapeake Bay marsh grass bacterium, which scientists found has an enzyme that could quickly break down plant materials into sugar, which can then be converted to biofuel. The Zymetis researchers were unable to iso-

## BRIEFS

The **U.S. Air Force** is looking into alternative forms of energy that will reduce its dependence on foreign oil. It is considering building a network of plants that would convert domestic coal into synthetic fuel. The Air Force plans to fuel half of its North American aircraft with a blend of synthetic fuel by 2016, and it expects airlines to eventually follow. [www.af.mil](http://www.af.mil)

## The American Composites Manufacturers Association

announces an active role to introduce fiber-reinforced plastic composites into the International Building Code to promote the acceptance of composites in building construction. [www.acmanet.org](http://www.acmanet.org)

## The American Iron and Steel Institute

reports that for the month of January 2008, U.S. steel mills shipped 9,246,000 net tons, a 7.3% increase from the 8,614,000 net tons shipped in January 2007 and an 8.8% increase from the 8,495,000 net tons shipped in the previous month, December 2007. [www.steel.org](http://www.steel.org)

**ArcelorMittal** has been selected as a 2008 Energy Star Partner of the Year for Energy Management by the **U.S. Environmental Protection Agency**. It is one of three new companies to receive the award, and the first steel company to do so.  
www.arcelormittal.com

**Eastman Chemical Co.** announces that it will expand production capacity for Eastman Tritan copolyester products at its facility in Kingsport, Tenn. Tritan has higher heat resistance and improved ease of processing compared with traditional copolyesters.  
www.eastman.com

**Mistras Group Inc.** has acquired **Controlled Vibrations Inc.** located in Doylestown, Pa. CVI has been a leader in the Predictive Maintenance (PdM) Industry since 1991, integrating PdM technologies with maintenance program management.  
www.mistrasgroup.com

late the bacterium in nature, but they discovered how to produce the enzyme in their own laboratories. The result was Ethazyme, which degrades the tough cell walls of cellulosic materials and breaks down the entire plant material into processible sugars in one step, at far lower cost and with fewer caustic chemicals than current methods.

For more information: Steven Hutcheson, University of Maryland, College Park, MD 20742; hutcheso@umd.edu; www.umd.edu.

**EPA recognizes copper as antimicrobial material**

The U.S. Environmental Protection Agency (EPA) has approved the registration of antimicrobial copper alloys, with public health claims. These public health claims acknowledge that copper, brass and bronze are capable of killing harmful, potentially deadly bacteria. Copper is the first solid surface material to receive this type of EPA registration, which is supported by extensive antimicrobial efficacy testing.

The EPA registration is based on independent laboratory testing using EPA-prescribed protocols that demonstrate the metals' ability to kill specific disease-causing bacteria, including Methicillin-resistant *Staphylococcus aureus* (MRSA). MRSA is one of the most virulent strains of antibiotic-resistant bacteria and a common cause of hospital- and community-acquired infections.

Testing under EPA-approved protocols demonstrates that copper, brasses, and bronzes are effective against a number of disease-causing bacteria. For example, one study shows that on copper alloy surfaces, greater than 99.9% of MRSA "superbugs" are killed within two hours at room temperature. www.copper.org

**Nanotubes improve thermal conductivity in bonded joints**

A concept in which aligned multi-wall carbon nanotubes enhance thermal conductivity in adhesively bonded joints, an important step toward the development of electric aircraft, is being explored by research scientists at the Air Force Research Laboratory

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Materials and Manufacturing Directorate, in partnership with the University of Dayton Research Institute. In nearly all cases, heat-generating devices aboard aircraft are attached to structural members by adhesively bonded joints, which under current system design, provide relatively poor thermal conductivity.

The team carefully examined the material configuration and aligned multi-walled carbon nanotubes in the thickness direction to enhance the through-thickness thermal conductivity. The measured thermal conductivity of adhesively bonded joints incorporating aligned carbon nanotubes exceeded the thermal conductivity of their conventional counterparts by several orders of magnitude. This showed that aligned, multi-walled carbon nanotubes are notably effective and has opened opportunities for much-needed thermal property tailoring in structural joints.

For more information: Dr. Ajit K. Roy, Air Force Research Laboratory, Wright-Patterson Air Force Base, Dayton, OH 45433; tel: 937/255-9034; ajit.roy@wpafb.af.mil; www.wpafb.af.mil.

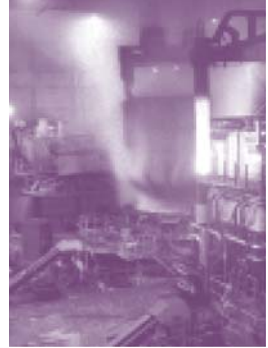
### Superplastic deformation joins ceramics invisibly

A method of joining advanced materials such as ceramics and intermetallics that results in an invisible seam with strength equal to or greater than that of each of the joined materials separately has been announced by Argonne National Laboratory, Argonne, Ill.

Called superplastic deformation, the process involves applying a small compressive stress to the two parts at a temperature equal to about half the melting point of the higher melting-point material. As the two parts are compressed, the principal deformation mechanism of grain sliding causes the grains to rotate. As they rotate, they inter-penetrate, resulting in a perfect bond with strength equal to the monolithic material.

In this process, multiphase materials such as ceramics can be joined seamlessly, without expensive, difficult-to-find equipment. A further key fact is that the joint is as strong as the materials that it unites and does not need a joining compound between the layers.

For more information: Dr. Jules Routbort, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; tel: 630/252-5065; routbort@anl.gov; www.anl.gov.



### BRIEFS

**OA Severstal** has reached an agreement to purchase Sparrows Point, a fully integrated steel mill based in Baltimore, Maryland, currently owned by **ArcelorMittal**.  
www.severstal.com

**Zenergy Power plc** announces that it has received a second commercial order for a full-scale high-temperature superconductor induction heater for the industrial heating of aluminum metal billets.  
www.zenergypower.com

## What Do These Market Leaders Have in Common?



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