Energy-saving steel sheet can dissipate heat from solar radiation

Prelaq Energy is a newly developed façade and roofing sheet that reduces the need for artificial indoor cooling in hot climates, according to SSAB Steel, Sweden. The sheet steel has qualities that contribute to reducing energy consumption in buildings by up to 15%. The secret lies in the organic coating mixtures and pigments, which are able to regulate inward heat radiation and contribute to a comfortable indoor climate. Prelaq Energy is available in a number of colors. The colors provide different qualities with respect to thermal dissipation. As a result, the material in the walls and the roof can contribute to saving energy for cooling and ventilation, and thereby lead to a reduced impact on the environment.

The steel will be in the roof and walls of the Swedish pavilion at Shanghai 2010, and a variant has been selected for internal wall cover. This variant has different characteristics and contributes to reducing heating needs in times of cold weather.

To create extra interest and character, the sheet will be perforated with various patterns, as shown in the photo. The qualities of the material can be compared with tree leaves that act as a heat transfer medium in times of strong solar radiation.

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Composite body armor made of cement and recycled carbon fiber

A new type of composite body armor made of super-strong cement and recycled carbon fiber materials is tough enough to withstand most types of bullets, say engineers at the University of Leeds, England. The cement vest project, still at the early research stage, is being carried out by the School of Civil Engineering at the University.

According to team leader Dr. Philip Purnell, “The fact is that many of the armored vests sold today are over-engineered for the threats they face. Cement-based body armor would not only create a whole new market, but also it would take some of the pressure off the demand for high-spec alumina models, so that soldiers who really need such armor can get it.”

In the past, U.K. and U.S. soldiers serving in Iraq and Afghanistan have faced shortages of alumina armor as production has struggled to keep up with soaring global demand.

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**BRIEFS**

**The Materials Technology Institute’s 2009 AsiaTAC meeting** (formerly named SinoTAC) for the chemical process industry will include a full-day stainless steel training seminar. To be held in Shanghai September 23–25, the agenda includes four panel discussions covering equipment fabrication and inspection, nickel base alloys, corrosion under insulating, and gasket vendor qualification. www.mti-global.org

**Sandvik Materials Technology** has signed a multi-year delivery contract for steam generator tubes for the nuclear power industry. The contract is valued at more than SEK 2 billions, and deliveries will begin in the end of 2013. The customer is the French company AREVA NP SAS, and the steam generator tubes will be used in nuclear power plants all over the world. www.sandvik.com

**United States Steel** says that its hot-rolled sheet steel is rolled from 100% continuous cast slabs. Continuous casters supply hot strip mills with the best quality slabs produced anywhere in the world.

**Diamond-aluminum composites designed for heat management**

Advanced powder metallurgy metal-diamond composites with silver, aluminum, and copper matrices that exhibit high thermal conductivity in the range of 400 to 700 W/mK have reportedly been developed at Plansee High-Performance Materials, Austria. The composites have a CTE of about 6 to 9 ppm/K, matching that of most semiconductor materials. The metal-diamond composite is now mature enough to enable thermal management applications in current and future high-end technological fields such as high-power laser diode packaging, LED, and microprocessor units.

Advantages of diamond composites for thermal management applications:
- Superior thermal conductivity with controlled expansion
- Isotropic thermal properties for excellent thermal spreading
- Metallized surfaces for optimal surface quality
- Ni/Au standard coatings and other custom coatings available
- Easy die attach with standard solder and other thermal interface materials
- Reduced thermal stresses for better device performance and reliability
- Innovative solutions for high performance applications

Diamond composites are metallized with a copper or silver layer, enabling further surface machining operations such as lapping and diamond milling to ensure both smooth and flat surfaces. A variety of coatings such as Ni, Ni/Au, Ni/Ag, Ti/Pt/AuSn can be supplied by in-house coating technologies. http://www.plansee.com/lib/TI_Diamond_composites_12_06.pdf

**Aluminum drilling riser systems developed for offshore development**

Alcoa announces that it has signed a development agreement with Cameron to commercialize aluminum drilling riser systems for offshore oil and gas exploration and development. Houston-based Cameron markets and develops various products for the oil and gas market and is a market leader in the offshore drilling risers business. Alcoa is an expert in aluminum technology and the design and manufacture of aluminum products. The two companies will combine their expertise and collaborate on research and development projects to broaden the market for aluminum drilling riser systems.

The lightweight aluminum riser system will extend the capability of existing drilling vessels, allowing exploration in deeper depths of 20% or more versus conventional steel risers. Welded aluminum risers weigh nearly 40% less than steel risers and require up to 40% less buoyancy material for similar depths. This weight savings equates into cost savings, because aluminum risers are easier and less expensive to transport, store and deploy.

“The aluminum drilling riser system is an innovation that could significantly change deep water oil and gas drilling,” said Mary Zappone, President, Alcoa Oil & Gas.

Alcoa recently announced that it has agreed to purchase Noble Corporation’s intellectual property pertaining to welded aluminum risers, enabling Alcoa to form this cooperative partnership with Cameron to develop lightweight welded aluminum risers for deepwater applications. www.alcoaoilandgas.com

**Lithium-manganese oxide designed for battery cathodes**

A composite cathode material made of lithium- and manganese-rich mixed-metal oxides may extend the operating time between charges, increase the calendar life, and improve the inherent safety of lithium-ion cells. Developed at Argonne National Laboratory, Argonne, Ill., the enhanced stability of the composite material permits battery systems to charge at higher voltages. This leads to a substantially higher energy storage capacity than currently possible through both the higher voltage and higher capacity per unit weight of active material.

The U.S. Department of Energy’s (DOE) Argonne National Laboratory and BASF, the world’s largest chemical company, have signed a world-wide licensing agreement to mass produce and market the materials to manufacturers of advanced lithium-ion batteries.

BASF will conduct further lithium-ion battery material application development in its facility in Beachwood, Ohio. BASF plans to build one of North America’s largest cathode material production facilities in Elyria, Ohio.

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