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What's New in the World of Superconductivity (June)

Power Applications

American Superconductor Corporation (June 19, 2002)

American Superconductor Corporation's commercial power quality superconductor magnetic energy storage (PQ-SMES) product has become Europe's longest continuously running superconducting electric power application. The product has been used to prevent momentary drops in voltage at Georg Fischer Mössner GmbH (an auto parts manufacturing facility) in Gleisdorf, Austria, since June 1999. The PQ-SMES system has protected the plant from several voltage problems, including the effects of lightning strikes. Voltage drops lasting for even 100 milliseconds can potentially stop or damage sensitive computer-controlled machinery in manufacturing environments, resulting in lost production time. Prior to installing the PQ-SMES unit, Mössner reported expenses arising from voltage drops of 150,000 euros in 1998. The installed PQ-SMES unit can withstand drops in voltage lasting for as long as 0.8 seconds up to a rated power of 1.4 megawatts. The unit can regulate longer voltage drops when the electric load is lighter. American Superconductor's current products can be used to protect higher electrical loads of more than 5 megawatts.
Source:
"American Superconductor Power Quality Solution
Now Europe's Longest Running Commercial Superconductor Power System"
(American Superconductor Corporation press release; June 19, 2002)
http://www.amsuper.com

MicroCoating Technologies (June 20, 2002)

MicroCoating Technologies (MCT) has demonstrated the fabrication of high-quality buffer layers for use in second-generation HTS tapes. The buffered tapes are produced using combustion chemical vapor deposition (CCVD) on rolling-assisted biaxially textured substrates (RABiTSTM). The major advantage of the CCVD process is the ability to produce long lengths of buffer layers in a vacuum-based, reel-to-reel system with a much lower production cost than that of traditional vacuum-based systems. The resulting buffer layers have a high degree of epitaxy and uniform characteristics over meter lengths. YBCO films deposited by pulsed laser deposition (PLD) onto these templates have exhibited critical currents of greater than 1 MA/cm^2. MCT hopes that their CCVD RABiTSTM buffers will become the substrates of choice for HTS development and manufacturing, allowing various superconductor deposition techniques to be benchmarked against each other. CCVD RABiTSTM buffered metal and buffered metal alloy tapes are commercially available from MCT. The CCVD RABiTSTM buffered tape technology was developed by MCT and Oxford Instruments Superconducting Technology (New Jersey, USA) and funded by the US Department of Energy, with administration through the Oak Ridge National Laboratory. MCT and Oxford will collaborate in the initial commercialization of this technology.
Source:

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"MCT announces CCVD RABiTSTM buffered tapes for use in second-generation high temperature superconductors"
(MicroCoating Technologies press release; June 20, 2002)
http://www.microcoating.com/

Communication

HYPRES, Inc. (April 30, 2002)

HYPRES, Inc., has been awarded a US $ 1.5 million contract from the Office of Naval Research (ONR) to develop a superconductor Bandpass Analog-to-Digital Converter (ADC) with a 5 GHz center frequency and a dynamically programmable bandwidth from 10 MHz to 400 MHz. The contract will allow HYPRES to continue its development of a family of ultra-high performance ADCs that are based on the ultra-high speed and ultra-low power requirements enabled by superconductor quantum technology. The single-chip ADC will convert RF signals to digital baseband data with an exceptionally high signal-to-noise ratio and a spur-free dynamic range. The development of this component is critical for the implementation of all-digital receivers suitable for radar and communications applications.
Source:
"HYPRES Awarded Contract to Continue Superconductor Bandpass ADC Development"
(HYPRES, Inc. press release; April 30, 2002)
http://www.hypres.com/pages/new/bnew_files/pr_bandpass.htm

ISCO International, Inc. (June 4 and 6, 2002)

The American Stock Exchange (AMEX) has approved ISCO International's application for listing its shares; trading is scheduled to begin on June 7, 2002, under the symbol "ISO". As a result of this development, ISCO intends to cancel its previously announced plans regarding a reverse stock split. The stock listing will enable institutional investors and brokerage firm analysts to invest in or issue research reports regarding ISCO International.
Source:
"ISCO International to Be Listed on American Stock Exchange; Reverse Split To Be Cancelled" ,
"ISCO International to Begin Trading on American Stock Exchange on Friday, June 7, 2002 Under New Symbol 'ISO'"
(ISCO International, Inc. press releases; June 4 and 6, 2002)
http://www.iscointl.com/

Basic

Brookhaven National Laboratory (June 17, 2002)

Researchers at the U.S. Department of Energy's Brookhaven National Laboratory, the U.S. Department of Commerce's National Institute of Standards and Technology (NIST), and the University of Oslo in Norway have reported new insights into the mechanism of superconductivity in magnesium diboride (MgB_2). Their results appeared in the June 17, 2002 issue of Physical Review Letters. The

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group examined the electronic structure of MgB_2 using x-ray absorption spectroscopy (performed at the National Synchrotron Light Source [NSLS] at Brookhaven) and electron energy loss spectroscopy using transmission electron microscopes (TEMs). These two complementary techniques enabled the scientists to accurately determine the distribution and number of electron "holes", or the empty spaces within a material's structure that can be occupied by electrons. Their results confirmed theoretical predictions that superconductivity in MgB_2 arises from interactions between the electron holes, and not the electrons themselves. In addition, the electron holes interact more easily within the parallel, alternating planes of boron and magnesium atoms than between adjacent planes. The researchers hope to use their observations to explain the macroscopic properties of superconductivity and eventually relate their findings to the origin of superconductivity in general.

Source:

"New insight into origin of superconductivity in magnesium diboride"
(Brookhaven National Laboratory press release; June 17, 2002)
http://www.bnl.gov/bnlweb/pubaf/pr/2002/bnlpr061702.htm

(Akihiko Tsutai, International Affairs Department, ISTEC)

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