

Houston company seeks to accelerate superconducting capability with ORNL help

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An effort to transmit 150 times more electric power through long-length high-temperature superconductors as compared to conventional copper wire is the goal of a cooperative research and development agreement between the Department of Energy's Oak Ridge National Laboratory and Metal Oxide Technologies (MetOx) of Houston.

MetOx will seek ORNL's superconductivity expertise in working to increase the capacity to transmit unprecedented amounts of electricity through wires made by the modified metal organic chemical vapor deposition process developed at the University of Houston.

ORNL will focus its work on characterizing the properties and microstructure of the enhanced wire and will provide feedback to MetOx regarding its research effort. Magnetic field and X-ray texture analysis facilities at ORNL's Accelerated Coated Conductor Laboratory will be the location for the characterization effort.

"At Oak Ridge, they have both the capability and the interest to support MetOx's need to understand the basic science underlying its technology," said Lou Castellani, MetOx president. "This collaboration will soon lead to a viable commercial product, which will benefit society in general."

MetOx officials expect to start producing long lengths of second generation superconducting wire early next year in Houston where superconducting technology got its start almost two decades ago.

ORNL helped pioneer a new generation of high-temperature superconductors through its development of the rolling-assisted, biaxially textured substrates (RABiTS™) technology that was developed at the laboratory. RABiTS is a roll textured and annealed metal tape-covered with one or more metal buffers or conditioning layers. This provides the template for the high temperature superconducting compound yttrium-barium-copper-oxide (YBCO).

"This is the laboratory's latest effort to assist the Department of Energy in reaching its goal of having a viable, high-temperature superconductivity industry in place by 2010 with several different companies competing in the marketplace," said Bob Hawsey, manager of ORNL's Superconductivity Program.

Superconducting technology will enable more efficient generation of electricity. About 8 percent of all electricity generated in the United States never reaches the customer because of inefficiencies in the transmission and distribution system. When fully deployed, researchers believe that high-temperature superconducting technology will improve electric transmission efficiency and save more than \$1 billion per year in electrical losses. Other benefits will be more compact transmission cables and lighter, smaller motors and generators.

MetOx currently operates the world's only single pass continuous YBCO coated conductor production line, produces high quality coated conductor wire and sells samples for testing. MetOx's low vacuum in-line process eliminates the need for expensive multistep production operations and a clean room environment. The line is approaching commercial optimization.

Based on deposition technology licensed from the Texas Center for Superconductivity and the Space Vacuum Epitaxy Center - a NASA space commercialization center - MetOx engineered a viable production

system for thin-film YBCO wire. MetOx has applied for 23 U.S. and foreign patents.

Source: ORNL

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