Press release

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THEVA sets new standards for superconductors

Ismaning, August 12, 2011 · Within the framework of a research project supported by the German ministry of economy and technology THEVA succeeded to fabricate high temperature superconductors (HTS) with unparalleled performance. Chilled with liquid nitrogen these HTS coated conductor tapes can transport currents over 1.000 A/mm^2 without losses, i.e. 300-500-times more than conventional copper wire in electrical power applications.

HTS coated conductors consist of a flexible steel tape coated with a thin layer of HTS material, which can carry current without losses. Since these superconductors only exhibit their full performance when grown nearly single-crystalline, an oriented buffer layer is deposited in a first step to supply an oriented substrate. On top, the superconductor layer grows epitaxially – a process very similar to semiconductor chip production.

Theoretically, the current carrying capacity of the tape simply scales with HTS film thickness. However, nature sets limits to the thickness due to increasing defect incorporation and growth. THEVA has developed a unique method to halt the defect growth within the superconductor layer. This allows fabrication of thick monolithic HTS coatings (> 5 μm) without sacrificing quality and without changes in the deposition process. This material is carrying 3 – 4 times higher currents than currently available commercial HTS coated conductors.

The main benefit of HTS tapes for electrical engineering and power technology is their extremely high power density. In large generators, power cables, and motors they allow reduction in weight and volume of more than 75% even including cryogenics. Additionally, the electrical efficiency of HTS components is enhanced due to reduced losses. There is no other technology that offers such dramatic improvements over conventional electrical systems.

Beyond the technical importance, the current carrying capacity demonstrated by THEVA also has massive economic impact. By enhancing a single out of many coating steps improves the cost - performance ratio and constitutes an enormous competitive edge. At the end of the day, for manufacturers of electrical systems and components the cost of the HTS-material decides on the competitiveness with conventional equipment. The new development will accelerate cost reduction, help to hit the ultimate cost target – the equivalent with copper cost – and facilitate the broad market roll-out earlier than anticipated. In a few years HTS coated conductors will become a real commodity.

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About THEVA Dünnschichttechnik GmbH

THEVA is the market leader in HTS coatings and has been developing flexible coated conductors for electrical power engineering for more than a decade. Thanks to a proprietary, independent technology access and a broad patent portfolio THEVA is taking a leading role in coated conductor technology.

THEVA also develops processes and coatings in the physical coating technology, e.g. for fuel cells, photovoltaic, and sensors.

The equipment manufacturing unit is based on a team of highly experienced professionals. THEVA is designing specialized equipment and components for physical coating and is leading in the quality control of superconductor coatings. THEVA‘s instruments are setting standards in HTS quality assurance worldwide.

Founded in 1996 the company is completely management-owned. The headquarters is located close to the international airport on the outskirts of Munich, Germany. THEVA is represented by sales agencies in Asia and the US.

About superconductors

Superconductors are materials conducting electric current without losses. Hence, their current carrying capacity is more than hundred times that of conventional copper wire. They allow construction of extremely efficient electrical devices, which are significantly more compact and light-weight than conventional equipment.