EuCARD-2

Enhanced European Coordination for Accelerator Research & Development

Scientific Report

High temperature superconductors towards applications

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High temperature superconductors towards applications

at SUPRA group, Institute for Technical Physics, Karlsruhe Institute of Technology

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At the division SUPRA, which is part of Institute of Technical Physics at Karlsruhe Institute of Technology we are focused on applications of high temperature superconductors (HTS). In this talk I will give a brief overview on topics and projects which are carried out by SUPRA and the recent results achieved.

On the international market there are several companies producing coated conductor (CC) material by quite different methods with different performances. At SUPRA we are focusing on application relevant CC material characterization and qualification from microstructural and transport properties point of view. For a couple of applications, these materials needs to be structured by laser into filaments or mechanically punched into Roebel strand geometry for

assembling the Roebel cable. Those advanced techniques are developed and optimized for lowering AC losses in CC materials and HTS cables. Beside AC losses such techniques and their preciseness influence in particular the field quality in DC coils. In that talk pros and cons of the CC material for applications in connection to striated CC and Roebel cable will be shown.

In particular we are partner of CERN in the EuCARD^2 project, specifically future magnets work package, in the frame of which a demonstrator of HTS insert dipole magnet is developed. This is first cable based HTS accelerator type demonstrator coil. We are responsible for producing and conditioning the Roebel cable, optimizing parameters and delivery of medium length cables (>20 m) to CERN and CEA Saclay, where preparation of demonstrator magnets is carried out. Status of the work is reported.