

High Current Superconductors: Overcoming the
Materials Challenges to Achieve Power Applications

Xavier Obradors
Institut de Ciència de Materials de Barcelona (ICMAB),
Barcelona - Spain

E-mail: obradors@icmab.es

Abstract - Achieving high current superconducting wires for large scale applications has been one of the most challenging objectives during all the HTS era. Extraordinary new ideas and materials developments have been demonstrated and second generation $\text{YBa}_2\text{Cu}_3\text{O}_7$ conductors (coated conductors) have emerged as the most attractive opportunity to reduce the cost/performance ratio down to the levels required for energy applications. These quasi-epitaxial multilayered films are deposited on flexible metallic substrates in long lengths without the detrimental influence of grain boundaries. Additionally, they can be accurately nanostructured to achieve very high vortex pinning strengths. All these features make coated conductors very appealing for practical power applications. In this talk I will present the major recent developments of the different coated conductor architectures and the present existing bottlenecks towards successful manufacturing of these advanced nanostructured materials. Emphasis will be made in describing the diverse nanostructuring opportunities to enhance vortex pinning based on cost-effective chemical deposition approaches. I will report as well about the research progress in CC development in Europe, particularly in the scope of the European research program EUROTAPES (www.eurotapes.eu).

Acknowledgements:

Research funded from EU-FP7 NMP-LA-2012-280432 EUROTAPES project

IEEE/CSC & ESAS SUPERCONDUCTIVITY NEWS FORUM (global edition), October 2013

Received September 30, 2013; Accepted October 15, 2013. Reference No. CRP 37; Category 5.

Paper based on this presentation was published by *Superconductor Science & Technology* (SuST, IOP) 27, No. 4, 044003 (2014).