

Opportunities of Solution Grown YBCO Coated Conductors. Let's Push Them Further

Teresa Puig

Institut de Ciència de Materials de Barcelona, CSIC, 08193 Bellaterra, Spain.

Email: teresa.puig@icmab.es

Abstract – Chemical Solution Deposition (CSD) growth emerged initially as a low cost and easier scalable methodology for fabrication of Coated Conductors. After several years of intense work, the scientific community demonstrated that CSD could also compete in performance, thus several groups and companies adopted CSD as their principle route for growth of the YBCO superconducting layer. The present understanding supports now a strategic impulse to go beyond the state of the art in several aspects. We should address multideposition-free thick layers, a higher throughput growth process, an all-CSD coated conductor, an outstanding nanocomposite performance. These are several open questions, that in my opinion, we are now in a good position to address to further push CSD for industrial competitiveness. In my presentation, I would like to discuss some of these issues and underline the present knowledge and opportunities. In particular, I will address aspects regarding reactivity, surface quality and reconstruction of a CSD buffer layer for YBCO growth; correlation of the properties of the gelified film to guide us towards a thick layer without cracking; understanding of the nucleation control to enable higher growth rates; identification of the desired pinning landscape in CSD growth of nanocomposites and determination of the requirements for pre-formed nanoparticles to use them in colloidal solutions for nanocomposite growth. I strongly believe that CSD is a powerful approach full of opportunities to create cost-effective coated conductors with outstanding performances.

Keywords (Index Terms) – CSD coated conductors, chemical solution deposition growth technique, present state of the art, challenges and opportunities, thick CSD layers, fast CSD growth, all CSD coated conductors, CSD nanocomposites.