

YBCO Coated Conductor Issues: Particulate Pinning Centers in $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ Films and Biaxially Textured Copper Alloy Substrates

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Part I

In superconducting coil applications such as generators, magnetic field will be present at a variety of angles to the coils. Hence a random distribution of flux pinning centers in YBCO films may be desired to avoid any preference for a given magnetic field orientation. A new technique that allows the separation of the respective constituents for a more controlled introduction of random particulates in YBCO coated conductors is developed. Initial results show that YBCO films with such particulates can be grown with critical current density $\sim 3\text{MA}/\text{cm}^2$ at 77K in self-field. Other results such as microstructure, magnetization J_c , etc. will be presented.

Part II

Recent advancements in YBCO coated conductors have been made primarily using Ni or Ni-alloy substrates. An attractive alternative to Ni-based substrate is Cu-based substrate since copper is non magnetic, has a sufficiently close lattice match with YBCO, and is six times cheaper than nickel. The results of rolling assisted biaxial texturing experiments to develop biaxial texture in Cu and Cu based alloys will be presented.