

Improvement of MOD Processing for YBCO Coated Conductors by Applying F-free Y & Cu Precursor Solution

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This talk will summarize recent progress in the MOD fabrication of YBCO coated conductors using F-free Y & Cu precursor solution. Total Fluorine content in the precursor solution for MOD processing of YBCO coated conductors can be significantly reduced by synthesizing precursor solution with F-free Y & Cu precursor and Barium trifluoroacetate (TFA). It was shown that crack-free and uniform precursor films were formed after calcination in humidified Oxygen atmosphere. Less than 2 hours are required to finish the calcination process and XRD measurement shows that BaF_2 , CuO , Y_2O_3 are major constituent of calcined precursor films. Film thickness after calcination was improved to be $\sim 2.8 \mu\text{m}$ by applying slot-die coating method. In particular, addition of Samarium into the F-free Y & Cu solution highly improve the solution viscosity and YBCO coated conductor prepared on the buffered Ni-W substrate using F-free Y & Cu solution containing excess Samarium shows critical current of $I_c=226\text{A/cm}$ ($J_c=3.4\text{MA/cm}^2$ @self field, 77K). Also discussed are recent developments in the Reel-to-reel processing using F-free Y & Cu precursor solution. It is shown that uniform and fast processing route to YBCO coated conductor with high I_c can be provided by employing F-free Y & Cu precursor solution in MOD process.

Keywords : coated conductor, F-free Y & Cu precursor solution, MOD, critical current

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