

MOD Derived Pyrochlore Films as Buffer Layer for All-chemical YBCO Coated Conductors

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Abstract - We report a detailed study performed on LZO pyrochlore material grown by Metal-Organic Decomposition (MOD) method as buffer layers for YBCO coated conductors. High quality epitaxial LZO thin films have been obtained on single crystal (SC) and Ni-5%at.W substrates. Films have been characterized by means of X-ray diffraction analyses (XRD), atomic force microscope (AFM), scanning electron microscope (SEM) in order to evaluate structural and morphological properties. Precursors solutions and heat treatments have been studied by thermal analyses (DSC, TG) and infrared spectra (FT-IR) with the aim of optimizing the annealing process. Thin films of YBCO have been deposited by pulsed laser ablation (PLD) on this buffer layers. The best results obtained on SC showed YBCO films with critical temperature values above 90 K, high self field critical current density values ($J_c > 1 \text{ MA/cm}^2$) and high irreversibility field values (8.3 T) at 77 K together with a rather high depinning frequency ν_p (0.5 T, 77 K) > 44 GHz as determined at microwaves. The best results on Ni-5 %at. W has been obtained introducing in the heat treatment a pyrolysis process at low temperature in air in order to remove the residual organic part of the precursor solution.

Keywords - Buffer layers, Coated conductors, CSD films, Lanthanum Zirconate, YBCO.

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