# Chemical solution growth of oxide multilayers for YBCO coated conductors *

M. Coll, A. Cavallaro, A. Pomar, J. Gàzquez, J. Gutiérrez, F. Sandiumenge. T. Puig and X. Obradors.

Institut de Ciència de Materials de Barcelona , CSIC, Campus U.A. Barcelona,

08193 Bellaterra, Spain

Chemical solution deposition (CSD) of thin films has emerged as a tremendously competitive technique for the development of advanced functional materials. Particularly interesting is its capability to produce epitaxial films on single crystal substrates or metallic templates, thus rising new opportunities for the low cost production of films for applications where the material anisotropy needs to be controlled. This is particularly interesting in the development of coated conductors base on the $YBa_2Cu_3O_7$ (YBCO) superconductor, where rather sophisticated architectures are required in order to guarantee the structural and chemical integrity of the superconducting films. In this context, the use of perovskite $SrTiO_3$ as final cap layer rises as one of the most promising choices due to its good crystallographic and chemical compatibility with YBCO. On the other hand, the lattice mismatch with an underlying template like IBAD-based or SOE-NiO/Ni tapes can be solved with a suitable intermediate perovskite layer as $BaZrO_3$. In this work we have concentrated on the growth conditions of $SrTiO_3$/$BaZrO_3$ multilayer heterostructure. As a model system multilayers of $SrTiO_3$/$BaZrO_3$ were deposited on $LaAlO_3$ (100) single crystal substrate by a CSD method. The growth temperatures of both buffer layers were modified between 600ºC and 900ºC to optimize the grain size and surface roughness. The final morphology of the layers was analyzed by X-ray diffraction, FT-IR and scanning electron microscopy. The influence of buffer layers precursors on the processing and microstructure properties were studied by DTG/DTA. YBCO films were deposited on top of the multilayer buffers by the so-called trifluoroacetates route. Optimized growth conditions lead to films with high critical currents. The role of the buffer layer microstructure on the final critical currents of the YBCO films is discussed.

*This work has been partially financed by the EU within the scope of the Solsulet project, contract No. G5RD-CT2001-00550