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Preparation and Microstructure of CaCu3Ti4O12 /SrTiO3 Multilayered Thin Films grown on LaAlO3 (100) Substrates by a Sol-Gel Method

In this work, highly quality CaCu3Ti4O12(CCTO)/SrTiO3(STO) heterostructures were successfully synthesized on LaAlO3 (LAO) substrate via a sol-gel method. The annealing temperature was fixed at 800 °C. Our films were deposited with four layers; CCTO/CCTO/CCTO/CCTO, STO/STO/STO/STO, CCTO/STO/CCTO/STO and CCTO/CCTO/STO/STO. From X-ray diffraction patterns, it was concluded that the CCTO, STO films and their multilayers deposited on LAO(100) substrates tend to be predominantly (h00) oriented. Based on our analysis, CCTO films have a cubic structure with estimated lattice parameters of 7.376 Å (3.688 Å) and for STO with estimated lattice parameters of 3.888 Å, while LAO has a pseudo-cubic structure with a calculated lattice constant of 3.790 Å. Interestingly, the TiO2 (004) anatase which is commonly present as an impurity phase in CCTO films was suppressed in CCTO/STO multilayer films. The surface morphology and the interface layer of the films were characterized by FE-SEM technique.

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