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Sr_2YSbO_6 as a Buffer Layer for $YBa_2Cu_3O_{7-\pm}$ Superconducting Films

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A complex perovskite oxide YSr_2SbO_6 has been synthesized by solid-state reaction. Structural ordering in this material has been studied by X-ray diffraction. The X-ray diffraction pattern reveals that YSr_2SbO_6 has an ordered complex cubic structure characteristic of A_2BBO_6 crystalline structure with lattice constant a =8:2561 A. The chemical stability of YSr_2SbO_6 with $YBa_2Cu_3O_7$ superconductors has been studied by X-ray diffraction and magnetic measurements on $YSr_2SbO_6/YBa_2Cu_3O_7$ composites. Magnetic measurements show that superconducting transition temperature of pure $YBa_2Cu_3O_7$ and $YSr_2SbO_6/YBa_2Cu_3O_7$ composites is 90 K. These studies show that YSr_2SbO_6 could be a potential candidate as a substrate material for films of $YBa_2Cu_3O_7$.

We also report growth and structural characterization of YSr_2SbO_6 films over MgO single crystal by magnetron sputtering. This layer has been developed for growth of superconducting $YBa_2Cu_3O_7$ films with good superconducting properties such as critical current density in self–field at 77 K. These results and good lattice matching and chemical stability between Sr2YSbO6 and $YBa_2Cu_3O_7$ make YSr_2SbO_6 an ideal choice as the buffer layer for high performance superconductor coatings. For instance, YSr_2SbO_6 could be used in coated conductor tapes with IBAD–MgO template.