

The effect of sintering temperature on the formation of (Tl, Cr)-1212 superconducting ceramic from coprecipitated oxalate precursors

ABSTRACT

TlSr1212 superconductors were synthesized by solid-state reaction using Tl-containing precursor powder prepared by coprecipitation of metal acetates with stoichiometric ratio based on $\text{Tl}_{0.85}\text{Cr}_{0.15}\text{Sr}_2\text{CaCu}_2\text{O}_7$ composition. The samples were sintered at temperatures between 960 and 980°C for duration of 5 minutes. XRD patterns for samples sintered at 960°C showed formation of dominant 1212 phase in addition to minor 1201 phase and SrCO_3 impurity. At this sintering temperature, the best superconducting behavior with $\text{TC}(\text{R}=0)$ of 100 K was observed for the sample sintered at 970°C. SEM investigations on the sample revealed elongated grains which belong to 1212 phase with a slight directional grain alignment. The sample with sintering temperature of 960°C showed better grains connection as compared to the rest of the samples.

Keyword: Coprecipitation; High temperature superconductors; Oxalic precursor