

Establishment of Manufacturing Process and Property Assessment of YBCO Single-crystals According to Y_2O_3 Content Variation.

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In this study, the manufacturing process of a 4cm class single-crystal was established through the variation of cooling rate and partial melting temperature by adding 0.3mol and 0.25mol of Y_2O_3 to starting powder $YBa_2Cu_3O_x + 1\%CeO_2$ based on the phase diagram. Heterogeneous nucleations were constrained by painting Yb_2O_3 -paste on bottom and side of specimen. The single grain was grown by top seeded melt growth (TSMG) method. $Sm_{1.8}Ba_{2.4}Cu_{3.4}O_x$ single crystal with size of $2 \times 2 \times 1 \text{ mm}^3$ used as seed crystal. Also, comparing and evaluating the properties of the manufactured single-crystals specimen investigated the optimal manufacturing process conditions.

Keywords : $YBa_2Cu_3O_x$, single crystal, heat treatment processing.