

Experimental Studies on the Macroscopic Anisotropy of High Temperature Superconductor YBaCuO

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To investigate the anisotropy of magnetization critical current density of high temperature superconductor (HTS) YBCO, two kinds of experiments were designed. First the current distributions were obtained from the trapped fields of a cubic bulk (#1) with $10.0 \times 10.0 \times 10.0 \text{ mm}^3$ in size at 77 K. Next two small samples were employed using vibration sample magnetometer system. Their size are $4.9 \times 1.1 \times 0.4 \text{ mm}^3$ (#2) and $1.0 \times 3.9 \times 0.8 \text{ mm}^3$ (#3) along the a , b and c axis respectively. It was found that the anisotropy ratios of critical current density in both cases are about 3.5 independent of the applied field at 77 K. While the field is kept constant at 1.0 T, the ratio increases as the temperature decreasing from 85 K to 20 K. Moreover, when the anisotropy ratio into account in the HTS computation modeling, the calculated levitation forces between superconductor and magnet agree with the experimental ones.

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