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Mon-Af-Po1.11-09 [9]: Development of Bi-2212 high temperature superconducting magnet

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High temperature superconductor Bi2Sr2CaCu2O8+δ (Bi-2212) exhibits high irreversibility field Hc2 of nearly 100 T, and high critical current density under high field with the Jc of over 6800 Amm-2 under 4.2 K, 15 T. Therefore, it shows great potential in the fabrication of low temperature, high field magnet. In our institute, Bi-2212 multifilamentary round wires with length over 200 m have been successfully prepared. With our optimized high pressure sintering technique, the current capacity of obtained wires has been obviously improved. The maximum engineering critical current density of 1300 A/mm2 has been obtained under 4.2 K, 5 T and over 800A/mm2 at 12T. With these wires, we have developed a Bi-2212 high temperature superconducting magnet through the winding and reacting method. The magnet inner diameter and outer diameter are 18mm and 45 mm, respectively, and its height is 80mm. It was made from 1.0mm diameter Bi-2212 wire with the length of 110 m. The wire was insulated with TiO2 paste. After the heat treatment at 5 MPa, the critical current of the magnet reach 340 A at 4.2 K and self field. The central field is calculated to be 5 T.

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