

Development of Conduction-Cooled Superconducting Magnet System for Material Control

Y. S. Choi*, D. L. Kim, B. S. Lee, H. S. Yang, W. M. Jung

Korea Basic Science Institute, Daejeon, Korea

The Korea Basic Science Institute (KBSI) has developed a 3 Tesla conduction-cooled superconducting magnet system for material control. The superconducting magnet for material control has to be designed to have a strong magnetic field in a control volume. Since the magnetic field gradient is larger at the end rather than at the center of the magnet, we have developed a design method to optimize the superconducting magnet for material control. The safety of the superconducting magnet was evaluated, taking into account the electro-magnetic field, heat and structure. The superconducting coil was successfully wound by the wet winding method. The superconducting coil was installed in a cryostat maintaining high vacuum, and cooled down to approximately 4 K by a two-stage GM cryocooler. The performance of the conduction-cooled superconducting magnet system is discussed with respect to the supplied current, joule heating, cooling medium and cooling power of a cryocooler.

keywords : Superconducting magnet, material control, conduction cooling, cryocooler