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Development of a High Current MgB_2 Wire for Electrical Applications

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A recently discovered MgB_2 is known to be a very promising superconducting material for MRI and electrical applications. Korea MgB_2 wire development research was started on September, 2006 as a project of the Ministry of Commerce, Industry and Energy, Korea. This is a 5 year project, where the total project budget is about 5 million USD, and the final research target is to develop a high current MgB_2 wire which is applicable to the electric power applications. During the first 3 years of this project, our work will be focused on the synthesis of a high-J_c MgB_2 powder and dopant materials useful to improve the J_c and a short length wire of a several tens of meters. During last 2 years, the development of the fabrication technology for 1 km length MgB_2 wire with a high-J_c will be the target. The developed wire technology will be transferred to a company which has an interest in the MgB_2 wire business.

Korea Atomic Energy Research Institute is a leading organization of the MgB_2 project. The experiences which have been achieved through the researches activities for the development of YBCO bulk(melt textured), BSCCO tape and YBCO coated conductor will be effectively utilized to find the new pinning medium for, and finally to develop the high-J_c MgB_2 wires. Two private companies of Duksung Co. and Ceracom Co. and two universities, Sungkyunkwan university and Kyungsang university are involved in the project as collaborators. The Duksung Co. and Ceracom Co. are in charge of the AC loss estimation and solenoid design using a MgB_2 wire, and a powder synthesis, respectively. The two universities are responsible for developing new wire fabrication technology and studying flux pinning mechanisms, and investigating a miscrostructure regarding a defect generation of MgB_2, respectively.