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Mon-Af-Po1.11-08 [8]: Development of a Bi-2212 Solenoid Insert Coil in a 14T Superconducting Magnet

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Compared to low temperature superconducting materials (LTS), Bi-2212 is more promising due to excellent current-carrying capability in ultrahigh magnetic field. In order to verify the long-line performance and small-scale superconducting magnet technology, a 2 T Wind & React Bi-2212 solenoid insert coil has been designed and fabricated at Institute of Plasma Physics, Chinese Academy of Science (ASIPP). The inner and outer diameters of the insert coil are 20mm and 32mm with 50mm height respectively. The No-Insulation (NI) winding technology is used to coil manufacture. The coil were reacted under 30 bar pressure followed the heat treatment process ordered by Northwest Institute for Non-ferrous Metal Research in China (NIN). It will generate a maximum central field of 16 T in a cold bore of 70 mm background field magnet at 4.2K. This study confirmed that present performance of the Bi-2212 round wire had satisfied the required high-field condition. This effort can also provide experience for superconducting magnet further design and experiment. This paper mainly presents the design, fabrication and pre-experiment of the insert coil, including wire specifications and heat treatment R&D, coil structure, no-insulation winding test and assessment.

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