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Thu-Mo-Po4.05-04 [34]: Critical Current under Axial Strain of High-Pressure HT Bi-2212 Round Wire

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China Fusion Engineering Test Reactor project (CFETR) , the next generation of Tokamak of China, has been incorporated into the important development of nuclear fusion in the future. Compared to low temperature superconducting materials, Bi-2212 is more promising due to the high irreversible field and outstanding current-carrying capacity. In particular, its critical properties can be improved dramatically by high-pressure heat treatment, which could enlarge its application range. The axial strain measurements on Bi-2212 round wire with different heat treatments were performed at 4.2K in 12T background field at Institute of Plasma Physics, Chinese Academy of Science (ASIPP). All samples are provided by Northwest Institute for Non-ferrous Metal Research (NIN) in China. The results showed that samples in 30 bar pressure heat treatment presented a more drastic degradation in compressive and tensile side than that of 50 bar pressure heat treatment. In order to study the influence of different thermal contraction coefficient between the substrate and sample on the experiment results, two springs with different materials were used in experiment. It was found that Cu-Be alloy spring is more compatible for Bi-2212 round wire as substrate than Ti-6Al-4V alloy spring from experiment results. In this paper, the experiment setup and results will be fully presented. This results also can provide experience for superconducting magnet further design and experiment.

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