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Wed-Af-Po3.25-01 [105]: Effects of carbon doping on trapped magnetic field of MgB₂ bulk prepared by in-situ hot isostatic pressing method

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MgB₂ bulk magnets have been strengthened by the densification, grain refining, and chemical doping. Ti-doped MgB₂ bulk fabricated by an in-situ hot isostatic pressing (HIP) method also offered the high trapped field, B_T of 3.6 T at 13 K [1]. The carbon doping is also well known to bring about the pronounced increase of both the critical current density J_c and the irreversibility field, H_{irr} [2]. In this paper, we report on the effects of C-doping on the trapped field properties of MgB₂ bulks, which were prepared by the in-situ HIP method. The B_T of 2.2 T at 20 K for the pristine bulk was increased to 2.5 T for the SiC10%-doped bulk. On the other hand, the B_T's of the C10%- and B₄C10%-doped bulks were decreased to 2.0 T and 1.6 T at 20 K, respectively. However, the temperature dependence of B_T indicates that the B_T of the C10%-doped bulk exceeds that of the pristine bulk below 15 K. We discuss the doping effects of carbon on the trapped field properties of MgB₂ bulks with different carbon sources.

References

- [1] T. Naito et al., Supercond. Sci. Technol., Vol. 28 (2015) 095009.
- [2] S. X. Dou et al., Appl. Phys. Lett. Vol. 81 (2002) 3419.

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