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Effects of SiC-doping on the trapped field properties of *in-situ* HIP-processed MgB₂ bulks

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MgB₂ bulk magnets have been strengthened by the densification, grain refining, and chemical doping. We found that the Ti-doped MgB₂ bulk fabricated by an *in-situ* hot isostatic pressing (HIP) method offered the high B_T of 3.6 T at 13 K [1]. C-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 SiC-doping on the trapped field properties of MgB₂ bulk. The Mg(B_{1-x}(SiC)_x)₂ ($x=0-0.2$) bulks were synthesized at 973-1173 K under gas-Ar pressure of 98 MPa by the *in-situ* HIP method, and then magnetized under 5 T by field-cooled magnetization. The B_T of 2.20 T at 20 K for the pristine bulk was increased to 2.25 T for the $x=0.05$ bulk and to 2.47 T for the $x=0.1$ bulk. However, further doping ($x=0.2$) deteriorated. On the other hand, the highest J_c and H_{irr} at 20 K were obtained for the $x=0.05$ bulk, and the J_c of $x=0.1$ bulk was somewhat smaller than that of the pristine bulk. We discuss an origin of the B_T -increase by SiC-doping in conjunction with the J_c properties, the connectivity, and the microstructure observation.

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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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