

## Effects of nano-SiC addition on the superconducting properties of magnesium diboride

### ABSTRACT

In this study, we report the results on phase formation, microstructures, and superconducting properties of a series of MgB<sub>2</sub> samples with different level of SiC additions. The polycrystalline samples were prepared via solid state reaction by mixing magnesium, boron and silicone carbide powders according to the ratio of Mg:B:SiC = 1:2:x. XRD spectra showed that MgB<sub>2</sub> is the primary phase while Mg<sub>2</sub>Si, MgO and MgB<sub>4</sub>, together with some unreacted SiC are the secondary phases as the addition increases. The presence of Mg<sub>2</sub>Si became more significant as the addition level increased. SEM images showed smaller grains as the addition level increases indicating more grain boundaries were formed. The T<sub>c</sub> was as low as 30.5K for x=15wt%. The field dependence of J<sub>c</sub> showed that x=1wt% sample gave the best performance at both 5K and 20K.

**Keyword:** MgB<sub>2</sub>; MgO; MgB<sub>4</sub>; Superconducting properties