

## Enhancement in critical current density and irreversibility field of bulk MgB<sub>2</sub> by C and CaCO<sub>3</sub> co-addition

### Abstract

Paper ash, a source of C and CaCO<sub>3</sub>, was used for the first time as a cheap form of sub-micron particles for doping. 0–10 wt% of the ash was added to Mg + 2B and in situ reacted at 850 °C for 30 min in flowing Ar atmosphere. The CaCO<sub>3</sub> decomposed and reacted with B to form CaB<sub>6</sub> as an impurity phase. Also, the T<sub>c</sub> and the a-axis lattice parameter decreased with increasing ash content, which suggests that C substitution at boron sites occurred. Enhancement of high-field J<sub>c</sub>(H), H<sub>irr</sub>(T) and H<sub>c2</sub>(T) was observed with an optimum level of about 5 wt% ash addition

**Keyword:** Paper ash, C and CaCO<sub>3</sub>, superconductor