Structural and Superconducting Property Variations with Nominal Mg Non-Stoichiometry in MgxB2 and Its Enhancement of Upper Critical Field

ABSTRACT

By applying a combination of characterisation tools, changes in structural and superconducting properties with nominal Mg non-stoichiometry in MgxB2 are found. The non-stoichiometry produces enhanced in-field critical current densities (Jc’s) and upper critical field / irreversibility field (Hc2/Hirr(T)) values. Upper critical fields of ~ 21 T (4.2 K) were obtained in nominal Mg-deficient samples compared to ~ 17 T (4.2 K) for near-stoichiometric samples.