

Structural and Superconducting Property Variations with Nominal Mg Non-Stoichiometry in Mg_xB_2 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 Mg_xB_2 are found. The non-stoichiometry produces enhanced in-field critical current densities (J_c 's) and upper critical field / irreversibility field ($H_{c2}/H_{irr}(T)$) 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.