

Evaluation of carbon incorporation and strain of doped MgB₂ superconductor by Raman spectroscopy.

Abstract

Raman spectroscopy is employed to study both the strain and the carbon substitution level in SiC-doped MgB₂ bulk samples. Raman spectroscopy was demonstrated to be a better method to distinguish the individual influences of strain and carbon than standard X-ray diffraction. It is found that the lattice parameter correlation method for C content determination is invalid for highly strained samples. Our result also provides an alternative explanation for lattice variation in non-carbon-doped MgB₂, which is basically due to lattice strain.

Keyword: Carbon doping; Raman spectroscopy; Superconductors; X-ray diffraction.