Phase formation of REBa2Cu3O7−δ (RE: Y0.5Gd0.5, Y0.5Nd0.5, Nd0.5Gd0.5) superconductors from nanopowders synthesised via co-precipitation

ABSTRACT

Phase formation of REBa2Cu3O7ī ŭ (RE: Y0.5Gd0.5, Y0.5Nd0.5, Nd0.5Gd0.5) superconductors synthesised via co-precipitation (COP) method were investigated by thermogravimetric analysis (TGA), differential thermal analysis (DTA) and X-ray diffraction (XRD) analysis. All samples showed identical thermal decomposition behaviour from the thermogram in which 5 major weight losses were observed. However, XRD of the samples at different heat treatment temperatures showed different diffraction patterns indicating different thermolytic processes. Meanwhile, transmission electron microscopy and surface area analysis revealed that the powders obtained from COP have particle sizes ranging from 7 to 12 nm with relatively large surface area. Molar ratios of prepared samples obtained were near to the theoretical values as confirmed by elemental analyses using X-ray fluorescence (XRF). The TC(R=0) for sintered YGd, YNd and NdGd were 87 K, 86 K and 90 K, respectively. Surface morphological study via scanning electron microscope showed the structures of samples were dense and non porous.

Keyword: Oxide; Superconductor; Powders: chemical preparation; Chemical properties