Influence of Er on microstructural and dielectric properties of CaCu3Ti4O12

ABSTRACT

Erbium-doped CaCu3Ti(4ī x)ErxO12 (x = 0, 0.02, 0.1, 0.2, 0.5, 1.0)ð (CCTEO) samples were synthesized by using the solï gel method. The crystal structure did not change on doping with erbium; and it remained cubic when all the six compositions were studied. It was found that lattice parameter increased slightly with Erbium doping. AFM studies showed that the particle size of the CCTEO powder ranged from 52 to 97 nm. The surface morphology of the samples sintered at 1,040 °C in air for 3 h was observed using a high resolution scanning electron microscope. It showed that the grain size was in the range of 0.7ï 5 µm for these samples. Er doping has been shown to reduce the dielectric loss remarkably while maintaining a high dielectric constant. This result indicates that 0.02 mol% of Er dopant can be used to improve the dielectric properties (dielectric constant- 164,000) of CaCu3Ti4O12.

Keyword: CaCu3Ti4O12; Erbium; Dielectric properties