Performance of barium titanate@ carbon nanotube nanocomposite as an electromagnetic wave absorber

Abstract

Barium titanate (BT) nanoparticles were fabricated using sol–gel method, and then immobilized onto the surface of carbon nanotubes (CNTs) to fabricate heterogeneous barium titanate@carbon nanotube (BT@CNT) nanocomposites. The electromagnetic (EM) wave absorption ability increased as the weight fraction of BT@CNT increased. The BT@CNT 30 wt.% nanocomposites with thickness of 1.1 mm showed a minimum reflection loss (R.L.) of ~ – 37.2 dB (> 99.98% absorption) at 13.9 GHz with a response bandwidth of 1.6 GHz (12.3 ~ 13.9 GHz), and were the best absorber when compared to similar nanocomposites with different thicknesses. The relationship between conductivity and EM wave absorption properties was also discussed. Appropriate conductivity also plays an important role to obtain optimum absorption performance. BT@CNT nanocomposites exhibited significant absorption ability, and this indicates that they can be utilized as an effective EM wave absorber material.