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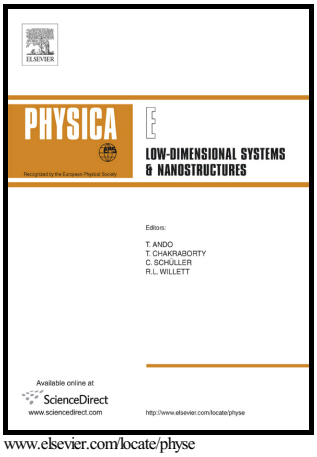

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Jitendra Bahadur, Kaushik Pal

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Structural and magnetic properties of reduced graphene oxide-TiO_2 Nanoflower composite

Jitendra Bahadur[1], Kaushik Pal[1,2*]

[1]*Centre of Nanotechnology, Indian Institute of Technology Roorkee, Roorkee, 247667, India*

[2]*Department of Mechanical and Industrial Engineering, Indian Institute of Technology Roorkee, Roorkee, 247667, India*

[*]Corresponding author . Tel no: +91-1332-284761; Fax: +91-1332-285665. E-mail address: pl_kshk@yahoo.co.in (K. Pal)

Abstract

We have focused on the structural and magnetic properties of hazardous acid free synthesis of anatase titanium dioxide (TiO_2) phase nanoflower and reduced graphene oxide-TiO_2 (rGO-TiO_2) nanocomposite using hydrothermal process. Because, strong acids free synthesis is environmental friendly and reduce overall cost of synthesized samples. In the synthesis of rGO-TiO_2, synthesized TiO_2 nanoflower and graphene oxide (GO) were used as reagents. The resulting materials have analyzed using different techniques such as, X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), Raman spectroscopy and Fourier Transformation Infrared spectrophotometer for confirmation of flower like morphology, crystalline phase and chemical composition. Moreover, VSM analysis has revealed the ferromagnetism induced in the rGO-TiO_2 composite at room temperature. The values of saturation magnetization were found to be 0.002 and ~ 0.243 ± 0.04 emu/g for TiO_2 nanoflower and rGO-TiO_2 nanocomposite, respectively. In comparison of pure TiO_2, rGO-TiO_2 exhibited larger magnetization at room temperature. This is because presences of various edge and site defects such as topological and point defects like vacancies, which create localized unpaired spins in reduced graphene oxide (rGO), induce the ferromagnetism behavior in rGO-TiO_2 nanocomposite.