

Structural and phononic investigation of MWCNTs-TiO₂ Nanocomposites by Modified Sol-gel method

Narges Hosseinzadeh Banafshehvaragh, Bahareh Fakhraei and Rasoul Malekfar

Department of Physics, Islamic Azad University, North Tehran Branch, Tehran, I.R. Iran,
hosseinzade.narges@gmail.com

Department of Physics, Tarbiat Modares University, P. O. Box 14115-175, Tehran, I. R. Iran,
Fakhraei.bahareh@gmail.com & Malekfar@Modares.ac.ir

In this research the microstructure of multi-walled carbon nanotubes (MWCNTs) and TiO₂ nanoparticles, nanocomposites which are synthesized in our lab by the sol-gel method have been investigated mainly by the back-scattering micro Raman spectroscopy. Different synthesized specimens were compared to each other. To confirm that we really synthesized MWCNTs-TiO₂ nanocomposites covered by TiO₂ we completed our analysis by XRD, SEM microscopy and EDX.

Raman peaks obviously approve the effect of the calcination on forming the anatase phase of TiO₂ by the constant structure of MWCNTs. Finally, the SEM images depict the surface coating of the MWCNTs by the nanocrystalline material of TiO₂. We observed the basic peaks of MWCNTs in XRD pattern which were overlapped by strong peaks of anatase TiO₂ and the width of these peaks were broadened which indicates the smaller crystalline size of the TiO₂.

[1]. W. Wang, Ph Serp, Ph Kalck, J. Faria, J. Molecular Catalysis **A: Chemical** **235**, 194–199 (2005).

[2]. C-Y Yen, Y-F Lin, C-H Huang, Y-H Tseng, C-C M Ma, M-C Chang, H. Shao, J. Nanotechnology **19**, 045604 (11pp) (2008).

[3]. A. Jitianu, T. Cacciagurra, M.-H Berger, R. Benoit, F. Béguin, S. Bonnamy, J. Non-Crystalline Solids **345&346**, 596-600 (2004).