



Contribution ID: 197

Type: Oral

Preparation of Polyurethane Acrylate/ Organically Modified Montmorillonite Nanocomposites by Electron Beam Radiation Curing

Thursday, 27 April 2017 18:10 (10 minutes)

The electron beam radiation curing of Polyurethane acrylate (PUA)/Montmorillonite (MMT) modified by octadecylamine (ODA-MMT) nanocomposites was investigated in this article. The nanocomposites were obtained and characterized by different techniques. The produced nanocomposites, showed remarkable improvement in their mechanical and morphological properties, compared to the pristine PUA. The XRD results revealed that the ODA-MMT silicate interlayer spacing increased up to 39 Å, indicating the intercalation structure. Whereas, the pristine MMT microcomposite showed agglomeration. The FTIR results confirmed the intercalation of the PUA chains in the silicate layers, nevertheless, the chemical structure of the PUA was not influenced by the presence of the silicate layers in the matrix. The mechanical properties of the nanocomposites showed incredible increasing in the modulus value, from 8.53±0.40 to 132.43±6.60 MPa by the dispersion of 5 wt% ODA-MMT in the PUA matrix, as well as the tensile and the dynamic mechanical properties were also improved. The radiation dose and the amount of the tri-functional monomer (TMPTA) in the formula were affected significantly the cross-linking affect the cross-linking density of the cured PUA nanocomposites.

Country/Organization invited to participate

Sudan

Primary author: Mr SALIH, Ashraf (Department of Radiation Processing, Sudan Atomic Energy Commission, Khartoum 1111, Sudan)

Co-authors: Mr HJ MOHD DAHLAN, Khairul Zaman (Polycomposite Sdn Bhd, No.75-2, Jalan TKS 1, Taman Kajang Sentral, 43000 Kajang, Selangor, Malaysia); Mr BIN AHMAD1, Mansor (Department of Chemistry, Faculty of Science, University Putra Malaysia 43400, UPM, Serdang, Selangor, Malaysia); Mr MAHMOOD, Mohd Hilmi (No.107, Jalan 2, Taman Kajang Baru, Sg Jelok, 43000 Kajang, Selangor, Malaysia); Mr IBRAHIM, Nor Azowa (Department of Chemistry, Faculty of Science, University Putra Malaysia 43400, UPM, Serdang, Selangor, Malaysia); Ms TAJAU, Rida (Radiation Processing Technology Division, Nuclear Malaysia, Bangi, 43000 Kajang, Selangor, Malaysia); Mr WAN YUNUS, Wan Md. Zin (Department of Chemistry, Centre for Defence Foundation Studies, National Defence University of Malaysia, 57000, Sungai Besi Camp, Kuala Lumpur, Malaysia)

Presenter: Mr SALIH, Ashraf (Department of Radiation Processing, Sudan Atomic Energy Commission, Khartoum 1111, Sudan)

Session Classification: A13

Track Classification: RADIATION SYNTHESIS AND MODIFICATION OF MATERIALS