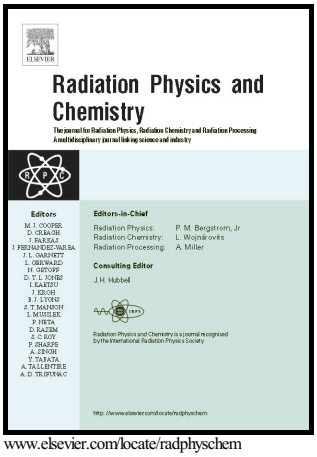
Author's Accepted Manuscript



www.elsevier.com/locate/radphyschem

Synthesis of modified sepiolite-g-polystyrene sulfonic acid nanohybrids by radiation induced graft polymerization

Shaista Taimur, Muhammad Inaam ul Hassan, Tariq Yasin, Syed Wasim Ali

PII: S0969-806X(17)31329-4
DOI: https://doi.org/10.1016/j.radphyschem.2018.02.020
Reference: RPC7779

To appear in: *Radiation Physics and Chemistry*

Received date: 29 December 2017
Revised date: 18 February 2018
Accepted date: 23 February 2018

Cite this article as: Shaista Taimur, Muhammad Inaam ul Hassan, Tariq Yasin and Syed Wasim Ali, Synthesis of modified sepiolite-g-polystyrene sulfonic acid nanohybrids by radiation induced graft polymerization, *Radiation Physics and Chemistry,* https://doi.org/10.1016/j.radphyschem.2018.02.020

Synthesis of modified sepiolite-g-polystyrene sulfonic acid nanohybrids by radiation induced graft polymerization

Shaista Taimur[1], Muhammad Inaam ul Hassan[1], Tariq Yasin[1,*] Syed Wasim Ali[2]

[1] Department of Metallurgy and Materials Engineering, Pakistan Institute of Engineering and Applied Sciences (PIEAS), PO Nilore, Islamabad, 45650, Pakistan.

[2] Chemistry Division, PINSTECH, PO Nilore, Islamabad, 44000, Pakistan.

ABSTRACT

In this study, polystyrene (PS) grafted sepiolite nanohybrid (MS-g-PS) was synthesized by using simultaneous radiation grafting technique in the presence of dichloromethane (DCM) as solvent. The radiation grafting process was carried out under inert atmosphere at room temperature using gamma rays from a Co-60 irradiator. The degree of grafting was affected by absorbed dose and monomer concentration in the mixture. Sulfonation of synthesized nanohybrid was carried out with sulfuric acid. Both the grafting of styrene and its sulfonate derivative were verified by Fourier transform infrared spectroscopy (FT-IR). The structural and morphological investigations of these nanohybrids have been investigated by X-ray diffraction (XRD) and field emission scanning electron microscopy (FESEM). The gravimetric investigations showed that grafting yield increases with the absorbed dose. Results showed that the system allows the controlled grafting of styrene onto sepiolite (Sep) in DCM.

Keywords: Radiation Grafting; Styrene; Nanohybrid; Ion exchange resins; Sepiolite

* Corresponding author: T Yasin; Email: yasintariq@yahoo.com; Phone: + 92 51 9248610; Fax: + 92 51 9248600