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Preparation, characterisation, drug loading and release properties of a novel KIT-6/poly(AA-EGDMA) nanocomposite

Anahita Shafiei¹ ; S. Yahya¹ ; Sh. Beheshtiha¹ ; [Majid M. Heravi](#)¹ ; Roozbeh Javad Kalbasi²

1- Department of Chemistry, Alzahra University, Vanak, Tehran, Iran

2- Faculty of Chemistry, Kharazmi University, Tehran, Iran

Abstract

A KIT-6/poly(acrylic acid-ethylene glycol dimethacrylate) (KIT-6/Poly(AA-EGDMA) nanocomposite was synthesised as an adequate carrier. KIT-6 as a three-dimensional cubic symmetric structure was prepared by the sol-gel method. Polymerisation was carried out through the in situ method in which EGDMA was cross-linked by AA inside KIT-6 pores. This mesostructure acts as a smart uptake and release of the ibuprofen (IBU) system. Diverse characterisation techniques including Fourier transform infrared spectroscopy, X-ray powder diffraction, Brunauer-Emmett-Teller, thermal gravimetric, scanning electron microscopy and ultraviolet-visible spectroscopy were employed to determine the relationship between the carrier nature and drug release performance. The KIT-6/Poly(AA-EGDMA) was modified by changing the ratio of the polymer and IBU as well as its time-loading. The results proved that the KIT-6/Poly(AA-EGDMA) has the ability of drug adsorption and slow release in a simulated body fluid.