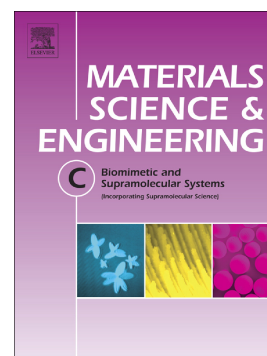


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Nano Silver Decorated Polyacrylamide/Dextran Nanohydrogels hybrid composites for Drug Delivery Applications

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ABSTRACT

Herein, novel biodegradable, stimuli responsive, chemically cross-linked and porous polyacrylamide/dextran (PAM/D) nanohydrogels hybrid composites are synthesized by *in situ* polymerization technique with incorporation of reduced nano silver. The interaction of nano silver with PAM in presence of dextran is investigated by Fourier transforms infrared spectroscopy (FTIR) and X-ray diffraction (XRD) studies. The elemental composition of the hybrid nanohydrogels is studied by X-ray photoelectron spectroscopy (XPS) whereas; the surface morphology of nanohydrogels hybrid composites is studied by field emission scanning electron microscope (FESEM) by which, it is observed that, the silver nanoparticles are homogeneously dispersed throughout the nanohydrogel network. From high resolution transmission electron microscopy (HRTEM), the average size of silver nanoparticles is found to be 20 nm. The swelling, deswelling and water retention properties of nanohydrogels hybrid composites are measured in order to investigate the release rate of the ornidazole drugs. The *in vitro* release rate of ornidazole drugs is found to be 98.5% in six hours. The antibacterial activities and the cytotoxicity tests along with positive and negative control of hybrid nanohydrogels are investigated. The loss modulus, gain modulus and complex viscosities are determined from rheological behaviour of the nanohydrogels. It is found that, the value of $\tan\delta$ varies from 0.1 to 0.8. Nano silver decorated PAM/D nanohydrogels are stable, nontoxic with antibacterial behaviour may be suitable for drugs delivery vehicle.

Key Word: Nano Silver; Nanohydrogel; Rheology; Swelling; Drug Delivery

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