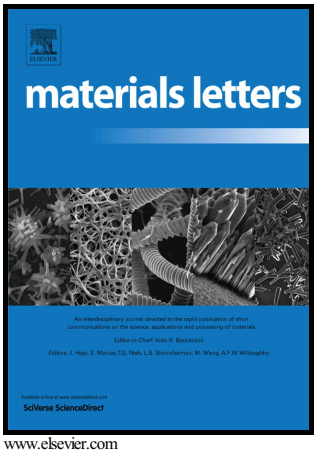

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Polysaccharides based antibacterial polyelectrolyte hydrogels with silver nanoparticles

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ABSTRACT

A new method has been employed for preparation of silver nanoparticles (Ag-NPs) in polyelectrolyte hydrogels (PEHs) composed from polysaccharides such as xanthan gum (XG) and chitosan (CS) without using other organic solvents and reagents. The present study allows a simple and ecofriendly synthesis of Ag-NPs within PEHs network and were confirmed by UV-Visible spectra with characteristic surface plasmon band in the range of 398-409 nm using different concentrations of silver ions. Highly controllable Ag-NPs with diameters of around 5-20 nm were obtained in PEHs with spherical shape. Scanning electron microscopy results confirmed that the Ag-NPs were formed homogeneously around the CS chains in the PEHs. Antibacterial activity of PEHs containing Ag-NPs has a great inhibition towards both gram-positive Staphylococcus aureus and negative-bacteria Escherichia coli. In vitro cytotoxicity and cell attachment studies with NIH 3T3 fibroblast cells on PEHs showed good cytocompatibile and that may be possibly used in antibacterial wound dressing applications.

Key words: Biopolymers; hybrid hydrogels; silver nanoparticles; cytocompatibile; antibacterial property.