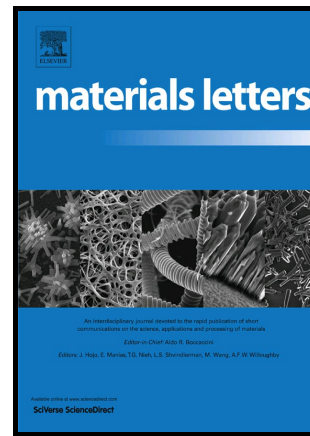


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Polysaccharides based antibacterial polyelectrolyte hydrogels with silver nanoparticles

Kummara Madhusudana Rao, Anuj Kumar, Adnan Haider and Sung Soo Han*

School of Chemical Engineering, Yeungnam University, 280-Daehak-Ro, Gyeongsan 712-749, South Korea,

*Email: sshan3892@gmail.com; sshan@yu.ac.kr, Tel: +82-53-810-2773; Fax: +82-53-810-4686

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 cytocompatible and that may be possibly used in antibacterial wound dressing applications.

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

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