

Synthesis and antibacterial activity of silver/montmorillonite nanocomposites

ABSTRACT

Silver nanoparticles (Ag-NPs) were successfully synthesized into the interlayer space of Montmorillonite (MMT) by chemical reduction method. AgNO₃ and NaBH₄ were used as a silver precursor and reducing agent, respectively. The properties of Ag/MMT nanocomposites were studied as a function of the AgNO₃ concentration. The UV-vis spectra of synthesized Ag-NPs showed that the intensity of the maximum wavelength of the plasmon peaks increased with increasing AgNO₃ concentration. The crystalline structure of the Ag-NPs and basal spacing of MMT and Ag/MMT were also studied by Powder X-Ray Diffraction (PXRD). The antibacterial activity of Ag-NPs was investigated against gram-negative bacteria (*Escherichia coli*, *Escherichia coli* O157:H7 and *K. pneumoniae*) and gram-positive bacterium (*Staphylococcus aureus*) by disk diffusion method using Muller-Hinton Agar (MHA) at different sizes of Ag-NPs. The smaller Ag-NPs were found to have significantly higher antibacterial activity. These results showed that Ag-NPs can be used as effective growth inhibitors in different biological systems, making them applicable to medical applications such as in surgical devices.

Keyword: Silver nanoparticle; Montmorillonite; Nanocomposites.