Green Synthesis of Gellan Gum-Stabilized Au Nanostructures and Their Catalytic Application

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Abstract

The gold nanostructures (Au NSs) exhibit the effects about size and shape and can be exploited for a number of advanced functional applications as sensors and in electronics and catalysis. The process of development of reliable and eco-friendly Au NSs is an important step in the field of bionanotechnology. To achieve this use of nature sources biological systems becomes essential. In the present work, we have investigated green method for synthesis of Au NSs using gellan gum (GG). Gellan gum(GG) is a linear, anionic heteropolysaccharide secreted by the microbe Sphingomonas elodea. It has unique suspension and versatile gelling performance for foods, cosmetics and so on. In our current study we have found that gellan gum (GG) has been employed as a reducing and stabilizing agent for the synthesis of gold nanoparticles. The size and shape of the nanoparticles can be controlled by different concentration of GG and $HAuCl_4$ in the reaction medium. The morphology of the nanostructures was studied by UV-vis-NIR, transmission electron microsopy (TEM), and scanning electron microscopy(SEM).

In general, the catalytic properties of Au NSs are a function of their size. The catalytic activities of the GG-Au NSs were investigated by monitoring photometrically the reduction of *p*-nitrophenol by an excess of $NaBH_4$.

Keywords: gold nanoparticles (AuNPs), gellan gum (Kelcogel), catalytic activity