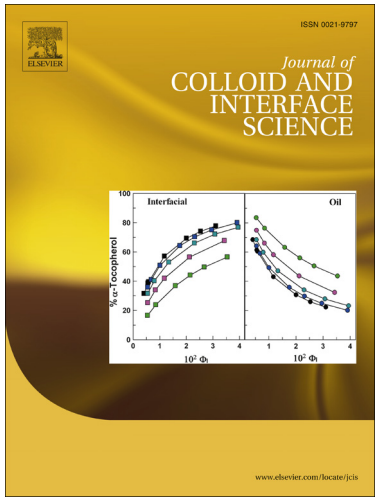

High-value utilization of egg shell to synthesize Silver and Gold-Silver core shell nanoparticles and their application for the degradation of hazardous dyes from aqueous phase-A green approach

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High-value utilization of egg shell to synthesize Silver and Gold-Silver core shell nanoparticles and their application for the degradation of hazardous dyes from aqueous phase-A green approach

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ABSTRACT: The common household material, egg shell of *Anas platyrhynchos* is utilized for the synthesis of Silver and Gold-Silver core shell nanoparticles using greener, environment friendly and economic way. The egg shell extracts were acting as a stabilizing and reducing agents. This method avoids the use of external reducing and stabilizing agents, templates and solvents. The effects of various reaction parameters, such as reaction temperature, concentration in the formation of nanoparticles have also been investigated. The compositional abundance of gelatin may be envisaged for the effective reductive as well as stabilizing potency. The mechanisms for the formation of NPs have also been presented. The synthesized Ag NPs formed were predominantly spherical in nature with an average size of particles in the range of 6-26 nm. While, Au-Ag core shell nanoparticles formed were spherical and oval shaped, within a narrow size spectrum of 9-18 nm. Both the Ag NPs Au- and Ag core shell nanoparticles showed characteristic Bragg's reflection planes of fcc structure and surface plasmon resonance at 430 nm and 365 nm, respectively.

The NPs were utilized for the removal of toxic and hazardous dyes, such as Rose Bengal, Methyl Violet 6B and Methylene Blue from aqueous phase. Approximately 98.2, 98.4 and 97 % degradations of Rose Bengal, Methyl Violet 6 B, and Methylene Blue were observed with Ag NPs, while the percentage degradation of these dyes was 97.3, 97.6 and 96% with Au-Ag NPs, respectively. Therefore, the present study has opened up an innovative way for synthesizing Ag NPs and Au-Ag bimetallic nanostructures of different morphologies and

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