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Microorganism-mediated, surfactant-directed synthesis of metal nanostructures

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Microbial reduction has emerged as a novel and viable alternative to chemical and physical methods for synthesis of metal nanoparticles in recent years. Generally, metal ions was adsorbed and reduced by the microbial surface, resulting in the very small nanoparticles that gradually grew into the metal nanoparticles over the microorganisms. However, the shape of the metal nanostructures cannot be effectively controlled by the microbial reduction. Inspired by this work on seed-mediated, surfactant-directed synthesis of metal nanostructures, we tried the very small nanoparticles as seeds for shape control of metal nanostructures. In our recent studies, the microorganism-mediated, surfactant-directed (MSD) approach was proposed to synthesize metal nanostructures. In the presence of microorganisms and surfactant (CTAB or CTAC), tunable metal-nanostructure/microorganism composites could be fabricated by reducing metal precursors with ascorbic acid at room temperature. The surface-enhanced Raman scattering (SERS) property and catalytic activity of the as-obtained materials were explored. Furthermore, the MSD approach could be also used to rapidly recover Au from aqueous solution. The phenomenon of microbially induced aggregation of Au nanostructures around microorganism in the presence of CTAB was described.

Biography

Jiale Huang completed his PhD at the age of 30 years from Xiamen University and is doing Postdoctoral studies at the Hong Kong University of Science and Technology. He is currently an Associate Professor of Department of Chemical and Biochemical Engineering, College of Chemistry and Chemical Engineering, Xiamen University. He has published more than 30 papers in journals.

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