

PREPARATION OF VARIOUS-SIZED GOLD NANOPARTICLES AND THEIR CATALYTIC ACTIVITY

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Abstract

The surfactants are commonly used as size modifiers in the chemical methods of metal nanoparticle preparation. In this study, effect of nonionic surfactant polysorbate on the size of gold nanoparticles prepared by the reduction method was evaluated. In the studied preparation method, reducing sugars were used as reducing agents and gold(III) chloride as source of gold ions. The realized experiments proved that the increasing concentration of nonionic surfactant reduce the size of emerged gold nanoparticles while their morphology is not influenced. The stability of the prepared gold nanoparticles was monitored by the measuring of UV-Vis spectra. Single absorption peak at about 530 nm without any shoulder caused by aggregation of the prepared nanoparticles was observed in the measured spectra. The as-prepared gold nanoparticles were subsequently evaluated for their catalytic activity. For this purpose, the reduction of 4-nitrophenol by sodium borohydride was used as a model reaction. The obtained results confirmed that smaller gold nanoparticles are more catalytic active than bigger nanoparticles due to their large specific surface.

Keywords: Gold, nanoparticles, polysorbate, size, catalysis

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