

Polyacrylate Modified Copper Nanoparticles with Controlled Size

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Abstract : The preparation of Cu nanoparticles (NPs) through the reduction of copper ions by sodium borohydride in the presence of sodium polyacrylate with a molecular weight of 1200 is reported. Cu NPs were synthesized at a concentration of copper salt equal to 2.5, 5, and 10 mM, and at a molar ratio of copper ions and monomeric unit of polyacrylate equal to 1:2. The as-prepared Cu NPs have diameters of about 2.5–3 nm for copper concentrations of 2.5 and 5 mM, and 6 nm for copper concentration of 10 mM. Depending on the copper salt concentration and concentration of additionally added polyacrylate to Cu particle dispersion, primarily formed NPs grow through the process of aggregation and/or coalescence into clusters and/or particles with a diameter between 20–100 nm. The amount of additionally added sodium polyacrylate influences the stability of Cu particles against air oxidation. The catalytic efficiency of the prepared Cu particles for the reduction of 4-nitrophenol is discussed.

Keywords : copper, nanoparticles, sodium polyacrylate, catalyst, 4-nitrophenol

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