

Synthesis of four elemental Cu-Ag-Pt-Pd nanoparticles by using Cu-Ag bimetallic nanoparticle as template

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Four elemental Cu-Ag-Pt-Pd nanoparticles were firstly synthesized by using Janus Cu-Ag bimetallic nanoparticle as template in aqueous solution at room temperature. Firstly, Janus Cu-Ag bimetallic nanoparticle was synthesized in one-pot procedure by using reaction of AgNO₃ and CuSO₄ with ascorbic acid in the presence of branched polyethyleneimine (BPEI) as stabilizer. In the growth process of Cu-Ag bimetallic nanoparticle, it illustrated that Ag nanoparticle not only could be used as a catalyst to accelerate reduction rate in the reduction of Cu ion by ascorbic acid, but also provided the active site on its' surface for the growth of Cu nanoparticles. To synthesize Cu-Ag-Pt-Pd, PtCl₄²⁻ and PdCl₄²⁻ was added in sequence into suspension containing Cu-Ag metallic nanoparticle, the presence of ascorbic acid effectively prevent galvanic replacement to make the Pt and Pd deposit on the surface of the Cu-Ag bimetallic nanoparticle.