

CHARACTERIZATION OF Au-Zn NANOPARTICLES BY HRTEM.

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The structure of bimetallic particles was studied by high resolution transmission electron microscopy (HRTEM). The particles were formed from different aqueous synthesis of bimetallic Au-Zn nanoparticles of different compositions. Depending on the composition, small bimetallic nanoparticles of 1-15 nm size were obtained. The average size and size distribution of the bimetallic nanoparticles are seen to be critically dependent on the atomic ratio of the constituting elements Au and Zn. While a 1:1 atomic proportion of Au and Zn produced most stable nanoparticles of smallest average size, nanoparticle produced with higher content of either of the component elements are unstable, inducing agglomeration and coalescence to form elongated structures with uneven morphologies. Au₃Zn₁ nanoparticles followed a directional growth pattern, producing bimetallic nanorods with multiple crystalline domains. Interestingly, in these rod-like nanostructures, the domains are in well array of solid solution-like bimetallic and pure mono-metallic regions alternatively. Such nanostructures with uneven morphology and compositions might show distinct catalytic selectivity in chemical reactions.