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**New experimental evidences of Au-$Cu_2S$ core-shell nanoparticles and atomic resolution imaging by aberration-corrected STEM**[1] SUBARNA KHANAL, GILBERTO CASILLAS, NABRAJ BHATTARAI, J. JESUS VELAZQUEZ-SALAZAR, MIGUEL JOSE YACAMAN[2], University of Texas at San Antonio — Au-$Cu_2S$ core-shell nanoparticles present different properties than their monometallic counterparts, opening a wide range of possibilities for different applications. Au-$Cu_2S$ core-shell nanostructures have raised interest for their many applications in photoelectronic, sensing, catalysis and so on. Au and Au-$Cu_2S$ core-shell nanoparticles were prepared by using a modified polyol method. First Au seeds were prepared by reducing $HAuCl_4.xH_2O$ in ethylene glycol (EG) in the presence of poly(vinylpyrrolidone) (PVP) as a polymer surfactant. Then $Cu_2S$ shells were overgrown on Au core seeds by reducing $CuSO_4$ in EG with PVP. The morphology and structural characteristics of Au and Au-$Cu_2S$ nanostructures were studied in detail using scanning electron microcopy HITACHI S-5500 and high resolution transmission electron microscope (HRTEM), a resolution 0.19 nm. Moreover, the Cs-corrected scanning transmission electron microscopy (Cs-corrected STEM) technique allowed us to probe the structure at the atomic level of these nanoparticles revealing new structural information. We determined the structure of the four main polyhedral morphologies obtained in the synthesis: decahedral, icosahedral, triangular plates, and rods.

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[2]Advisor

Subarna Khanal
University of Texas at San Antonio

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