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New Insights into the Structure of Multimetallic Nanoparticles and their Advanced Characterization SUBARNA KHANAL, NABRAJ BHATTARAI, JESUS VELÁZQUEZ-SALAZAR, GREGORY GUISBIERS, MIGUEL JOSE-YACAMAN, University of Texas at San Antonio — Noble multimetallic nanoparticles have led to exciting progress in a versatile array of applications. For the purpose of better tailoring of nanoparticles activities and understanding the correlation between their structures and properties, control over the composition, shape, size and architecture of bimetallic and multimetallic nanomaterials plays an important role on revealing their new or enhanced functions for potentials application. Advance electron microscopy techniques were used to provide atomic scale insights into the structure-properties of different materials: Pt-Pd, Au-Au_3Cu, Cu-Pt, AgPd-Pt and AuCu/Pt nanoparticles. These multimetallic nanoparticles have raised interest for their various applications in fuel cells, ethanol and methanol oxidation reactions, hydrogen storage, and so on. The nanostructures were analyzed by transmission electron microscopy (TEM) and by aberration-corrected scanning transmission electron microscopy (Cs-corrected STEM), in combination with high angle annular dark field (HAADF), bright field (BF), energy dispersive X-ray spectroscopy (EDS), and electron energy loss spectroscopy (EELS) detectors. These techniques allowed us to probe the structure at the atomic level of the nanoparticles revealing new structural information and elemental composition of the nanoparticles.

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