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John Wheatley Award Talk: Picometer Resolution Electron Microscopy a New Tool to Tailor Materials at the Atomic Scale[1]

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During the last decade Electron Microscopy has seen dramatic advances mainly due to the spherical aberration correction on the lenses and into the hardware for analyzing and recording signals. For the first time it is possible to study nanostructures at the atomic level in a reliable way many interesting outstanding problems on materials science can be attacked with the new tools, in particular the structure of matter at nanoscale has been a long standing problem. Nanoparticles have many significant technological affiliations in catalysis in medicine and others, all of which depend on the properties of nanosized matter. Advances in characterization is opening a new era in which is possible for the first time to come late structure with properties for nanoscale material. In this presentation,we will discuss some recent advances of the structure of nanoparticles using aberration corrected STEM and recent advances on the study of Bimetallic nanoparticles, we will show that the distribution of metals is more complicated that the simple Alloy or core-shell model.We have used picometer resolution images match with energy loss spectroscopy. It is found that the structure is in many cases 3 layer one, the first metal at the core a second metal in an intermediate layer and the external shell being the first metal again, this has very interesting implications for the optimization of metallic catalysis. Other examples will presented on this talk

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