Magnus Garbrecht, J Nanomed Nanotechnol 2014, 5:5
http://dx.doi.org/10.4172/2157-7439.S1.017

OMICS Group Conferences
Accelerating Scientific Discovery

4th International Conference on
Nanotek & Expo

December 01-03, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

Aberration-corrected HRTEM as an ultra-precise tool in materials science at the nanoscale

Magnus Garbrecht
Linköping University, Sweden

The invention of spherical aberration correctors that allow the Cs of the optical system in a high-resolution transmission electron microscope (HRTEM) to be tuned like a parameter to small negative values solves the problems of delocalization and complicated contrast transfer in a TEM which made experimental images inaccessible to direct interpretation, and pushes the spatial resolution of instruments to new limits. In fact, the enhanced contrast transfer together with the strong suppression of image delocalization under negative Cs imaging (NCSI) conditions is capable of resolving the atomic lattice structure of even complex systems, and the accuracy of spatial measurements has reached a few picometers. Atomic column positions of even very light elements like oxygen situated next to heavy elements have been detected with sub-atomic accuracy, and detailed quantitative analysis on interfaces in complex intercalation compounds with local lattice structure determination accuracies down to some picometers were demonstrated. In applications relevant to modern nanoscale technology, aberration corrected high-resolution TEM has since proven to play a key role in the understanding of crystalline materials properties through the study of their atomic configurations. The author will present an overview of achievement in terms of resolution and accuracy in atomic column detection at interfaces in solids, and select some examples from his own research that demonstrate the successful application of the technique in the field of materials science and nanotechnology, in particular at interface phenomena and in thin films of functional and electronic materials.

Biography

Magnus Garbrecht received his PhD in Materials Science at the University of Kiel (Germany) in 2009, and spend 3 years as a Postdoctoral fellow at the Technion – Israel Institute of Technology followed by another 2 years of Postdoc at Linköpings University, where he became Assistant Professor in the Electron Microscopy of Materials Group in 2014. He has published more than 20 peer-reviewed articles on materials science applications of aberration-corrected HRTEM.

magnus.garbrecht@liu.se