Characterization of Individual Nanowires and Nanorods with Field Emission Scanning Auger Microscopy

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Nanowires and nanorods offer the possibility of a wide range of applications such as FET devices, sensors and components of PV devices. The physical properties of these nanostructures are strongly correlated to their composition, dopant concentration, dopant profile, and surface oxidation.

Field Emission Scanning Auger Electron Microscopy is a powerful compositional analysis technique for nanotechnology structures. Modern field emission Auger systems that are designed for long term image stability and incorporate a CMA analyzer for Auger imaging without topographical shadowing can provide quantitative elemental information at better than 8 nm spatial resolution.

While Auger electron imaging provides significant chemical information, it may on occasion be advantageous to investigate the chemical environment spectroscopically. A new high energy resolution spectral analysis capability for the examination of surface chemistry has been developed for the PHI Scanning Auger Nanoprobe.

The Auger Electron Spectroscopy and imaging analysis of the surface chemical composition of individual Si nanowires and TiO_2 nanorods will be discussed. In addition, the ability to use Auger spectroscopy to obtain detailed information on the dopant concentration and the dopant profiles on silicon nanowires will be shown. Auger imaging of TiO_2 nanorods provides information on the electrochemical formation mechanism of these nanorods.