

The effect of oxidation on the structure of nickel nanoparticles

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Abstract:

The structural properties of nickel nanoparticles which are prepared by means of DC sputtering in argon and subsequently oxidized in ambient air are reported. Ex situ structural and chemical investigations utilizing (high resolution) transmission electron microscopy and electron energy loss spectroscopy reveal that the particles consist of a metallic core surrounded by an oxide shell. The lattice constant of the nickel core is found to increase significantly with decreasing particle size. This widening of the nickel lattice is attributed to an interfacial stress that originates from the lattice mismatch between nickel and nickel oxide.