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Thermodynamic Properties and Grain Growth in Pt Nanoparticles[1] KATHERINE SLOYAN, Imperial College London, THOMAS EKIERT, KARL UNRUH, University of Delaware — The evolution in the structural and thermodynamic properties of chemically prepared Pt nanoparticles has been studied by x-ray diffraction (XRD), transmission electron microscopy (TEM), differential scanning calorimetry (DSC), and ac magnetic susceptibility measurements. Depending on the synthesis conditions, the XRD and TEM measurements indicated that nanoparticles could be prepared with mean diameters between about 5 and 10 nm. A combination of XRD, TEM, and DSC measurements also indicated that the as-prepared nanoparticles were stable with respect to grain growth to temperatures of about 300 $^{\circ}$C. Above this temperature, grain growth resulted in an increase in the mean particle size and a slight increase in the Pt lattice parameter as well. AC susceptibility measurements as a function of the temperature indicate that with decreasing grain size there is an increase in the real part of the susceptibility and a corresponding decrease in the imaginary susceptibility.

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