

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Synthesis and Characterization of Rectangular Palladium Nanoparticles.¹ YUAN SUN, Dept. Mat. Sci. & Eng., SUNY at Stony Brook, LIHUA ZHANG, ELI SUTTER, YIMEI ZHU, Center for Functional Nanomaterials, Brookhaven National Laboratory, MIRIAM RAFAILOVICH, JONATHAN SOKOLOV, Dept. Mat. Sci. & Eng., SUNY at Stony Brook — The optical, magnetic and catalytic and electronic properties of nanoparticles are affected not only by their size, but also by their shape. We have used a mild reducing agent, ascorbic acid, in the presence of sodium citrate and a surfactant, cetyltrimethylammonium bromide, at ambient conditions to prepare colloidal rectangular palladium nanoparticles, including nanocubes and nanorods. Our procedure requires no seed-mediated growth or nanoporous template so that it is more practical for large-scale synthesis. Upon changing the concentration of sodium citrate from 0.2×10^{-3} M to 1.0×10^{-3} M, TEM measurements indicate that the average size of the nanocubes decreases slightly from 31.8 ± 3.2 nm to 29.4 ± 4.2 nm and the aspect ratio of the nanorods increases from 2.48 ± 1.42 to 3.94 ± 2.50 . HRTEM images and diffraction patterns indicate that the particles are highly crystalline and have strong (100) faceting. Being exposed to air for ~ 100 days, the particles are oxidized to form 2~4 nm-thick amorphous shells.

¹Supported by NSF-MRSEC. The CNF-BNL is supported by the U.S. DOE under DE-AC02-98CH10886.

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Date submitted: 12 Jan 2006

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