Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Morphology and the Catalytic Activity of Pd Nanoparticles on TiO_2- and SrO- Terminated $SrTiO_3$ Nanocuboids BOR-RONG CHEN, Department of Materials Science and Engineering, Northwestern University, CASSANDRA GEORGE, LINHUA HU, PETER C. STAIR, KENNETH R. POEPPELMEIER, RICHARD P. VAN DUYNE, Department of Chemistry, Northwestern University, YUYUAN LIN, MICHAEL J. BEDZYK, Department of Materials Science and Engineering, Northwestern University — We report how different surface terminations of $SrTiO_3$ (STO) influence the facetted-shape and catalytic performance of supported Pd nanoparticles. A new approach to catalyst studies by synthesizing STO nanocuboids with either TiO_2- or SrO- terminated surface as a support will be presented. The nanocuboids have well defined (001) surfaces and high surface area; therefore, practical catalytic reaction studies can be carried out while the support resembles the model catalyst surface. This study investigates the morphology and the catalytic activity of Pd nanoparticles deposited by atomic layer deposition (ALD) on STO nanocuboids with TiO_2 and SrO terminations. We demonstrate that the wt% loading and Pd nanoparticle size can be controlled by the number of ALD cycles. The morphology and chemical nature of the Pd particles are studied by TEM, X-ray scattering, and X-ray absorption fine structure measurements.

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Date submitted: 14 Nov 2013 Electronic form version 1.4