

HRTEM analyses of the platinum nanoparticles prepared on graphite particles using coaxial arc plasma deposition

Platinum nanoparticles with diameters less than 5nm were deposited on graphite particles by coaxial arc plasma deposition and its structure was investigated using high-resolution transmission electron microscopy.

Sample preparation

There is no mention of sample preparation to perform AFM.

Data acquisition conditions

TEM was performed on a JEOL JEM-2800 and calibrated using lattice images of high purity silicon crystals. No additional information is provided regarding the acquisition conditions.

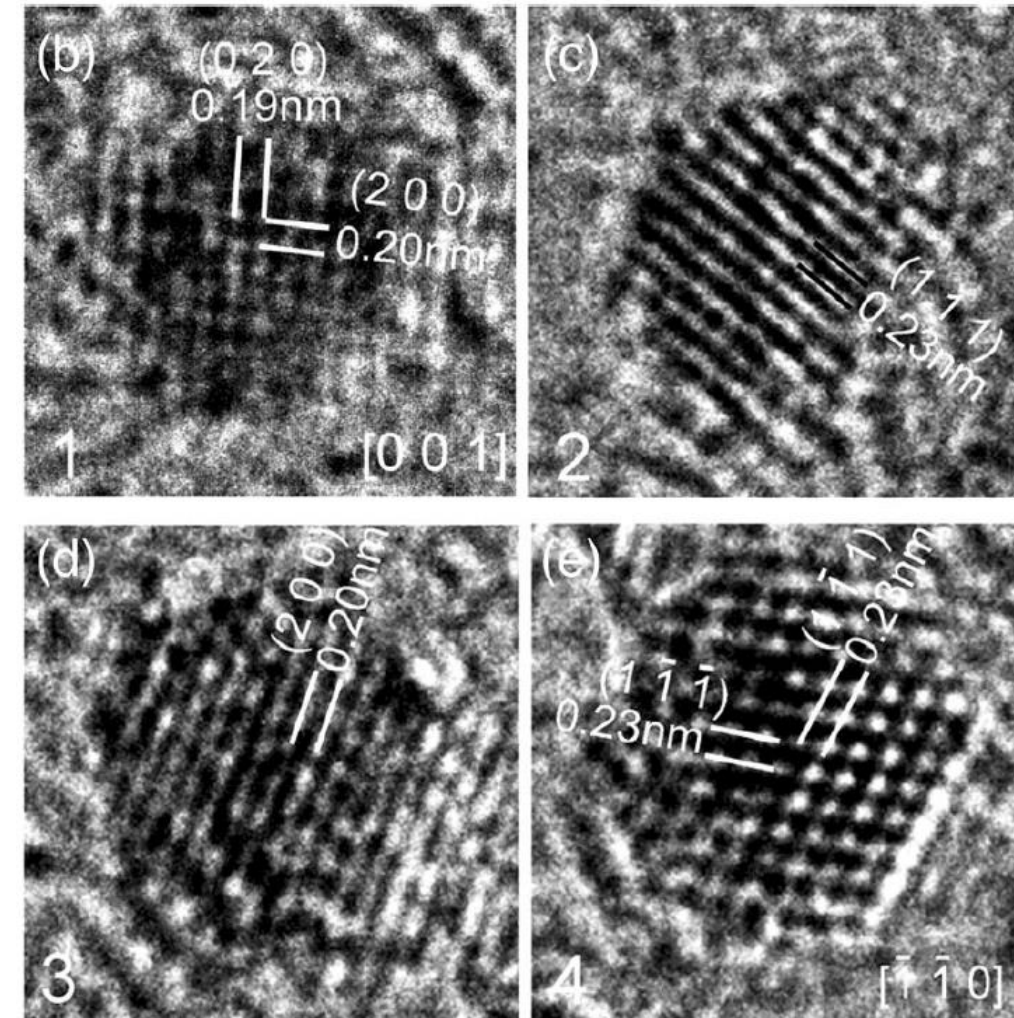
Results

Platinum nanoparticles were observed and their lattice constant calculated from the HRTEM images, there was no correlation between lattice constant and particle diameter.

Mean lattice constant was calculated to be $a = 0.388 \pm 0.015$ nm, which is $\sim 1\%$ smaller than bulk Pt lattice constant $a = 0.39231$ nm

Lattice strain was calculated using the bulk lattice constant as reference, the strain ranged from a compression of 5.9% to an expansion of 2.9%

Nanoparticles strain was found to not be equal in all directions, with some nanoparticles exhibiting compression in one direction and expansion in the other.



HRTEM images of Pt particles deposited on graphite particle. Some directions and interplanar spacing are shown in each image.