

Pt/Pd core/shell nanoheterostructures

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The aim of this work was to produce Pt/Pd core/shell shape-controlled heterostructures [1]. The use of Pt nanocube seeds offered a well-defined surface for the overgrowth of the Pd shell and for control of the final shape. In this report we present the use of HAADF, HREM and exit wave reconstruction to analyze structural coherency and the shapes of core and shell in Pt/Pd nanoparticle heterostructures. Fig. 1 (a) and (b) are low and high-resolution HAADF-STEM micrographs that show clearly the orientation of the cubic Pt seed within the Pd shell. Local distortions of the lattice at the buried interface can be extracted from the high resolution TEM image in Fig. 2a by displaying the geometric phase in a moiré image that offers a highly sensitive magnified view of atomic plane distortions. The corresponding moiré patterns obtained using the 200 (Fig. 2b) and 020 (Fig. 2c) reflections, show clearly that the interface structure is fully coherent [2].

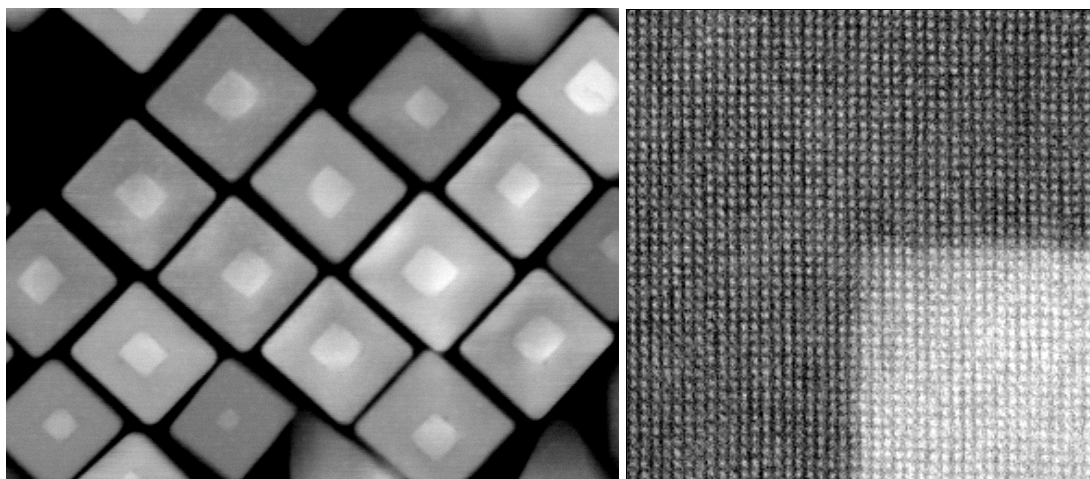


Figure 1: (a) Low resolution and (b) atomic resolution HAADF-STEM images showing contrast of the Pt core and Pd shell.

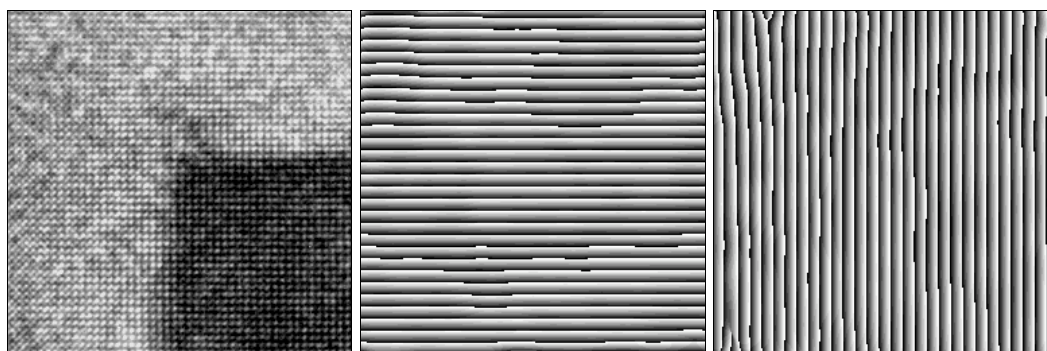


Figure 2: (a) HREM image of Pt core/Pd shell interface and corresponding moiré pattern obtained using 200 and 020 reflections showing clearly fully coherent interface structure.

References

[1] S. Habas et al., *Nature Materials*, **6** (2007) p692.

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