

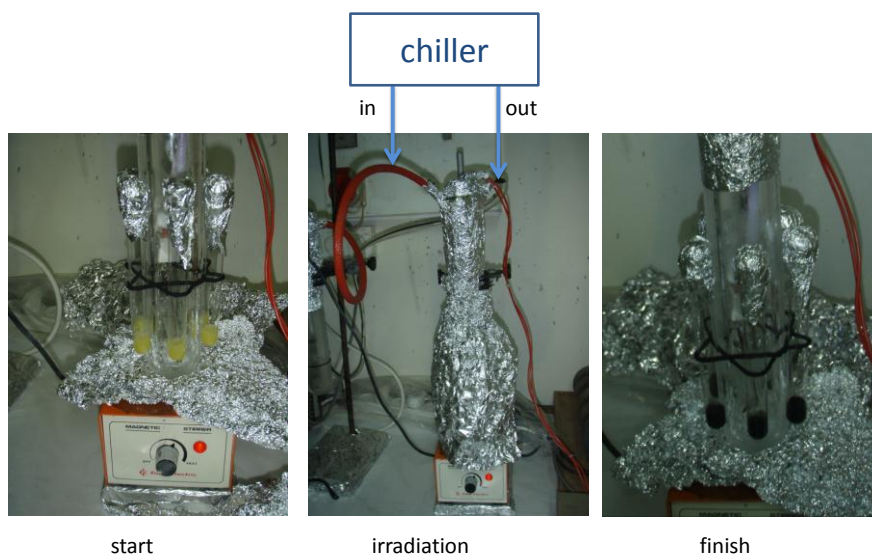
Electronic supplementary information (ESI) for

Controllable Photodeposition of Metal Nanoparticles on a Photoreactive Silica Support

Anna Peled, Maria Naddaka and Jean-Paul Lellouche*

Irradiation system

The photo-irradiation system is composed of an internal UV PHILIPS HPL-N (125W) lamp within a quartz double-jacketed water-containing envelope chiller set to operate irradiation experiments at room temperature (20°C). Digital photographs mentioned below showed exactly how the irradiation experiments have been executed. The reactions were performed in test tubes under vigorous stirring using magnetic stirrer. Whole system was covered with an aluminum foil, which reflects the UV light back and forth through the sample. The scheme below illustrates the use of several test tubes containing yellowish solutions of SiO₂@BPh NPs and hexachloroplatinic acid (**start**) before and resulted SiO₂@Pt NCs after irradiation (**finish**).



Scheme S1. Digital photos of irradiation system.

Procedure for hydrogenation of 4-nitrophenol

Hydrogenation activity of SiO₂@Pt NC₁₋₅: The catalytic activity of SiO₂@Pt NC₁₋₅ was measured using *p*-nitrophenol as a substrate in the liquid phase.¹ Briefly, 0.1 mL of SiO₂@Pt NC₁₋₅ dispersion containing 89 µg of Pt was added to 1 ml of 0.8 M NaBH₄ solution. The reaction mixture was stirred for 15 min at RT. Seven milliliters of 3.4 mM *p*-nitrophenol was added to the mixture and it was stirred until reaction completion. The reaction progress was spectrophotometrically monitored at 405 nm using a UV-Vis spectrometer (Varian CARY 100 Bio) at 1 min intervals. The catalytic activity of the commercial Pt/C supported HiSpec 9100 catalyst was measured in the same way. The rate constant was determined from the slope of the linear fit of lnA versus time, where A represents the 4-nitrophenol concentrations at time t.

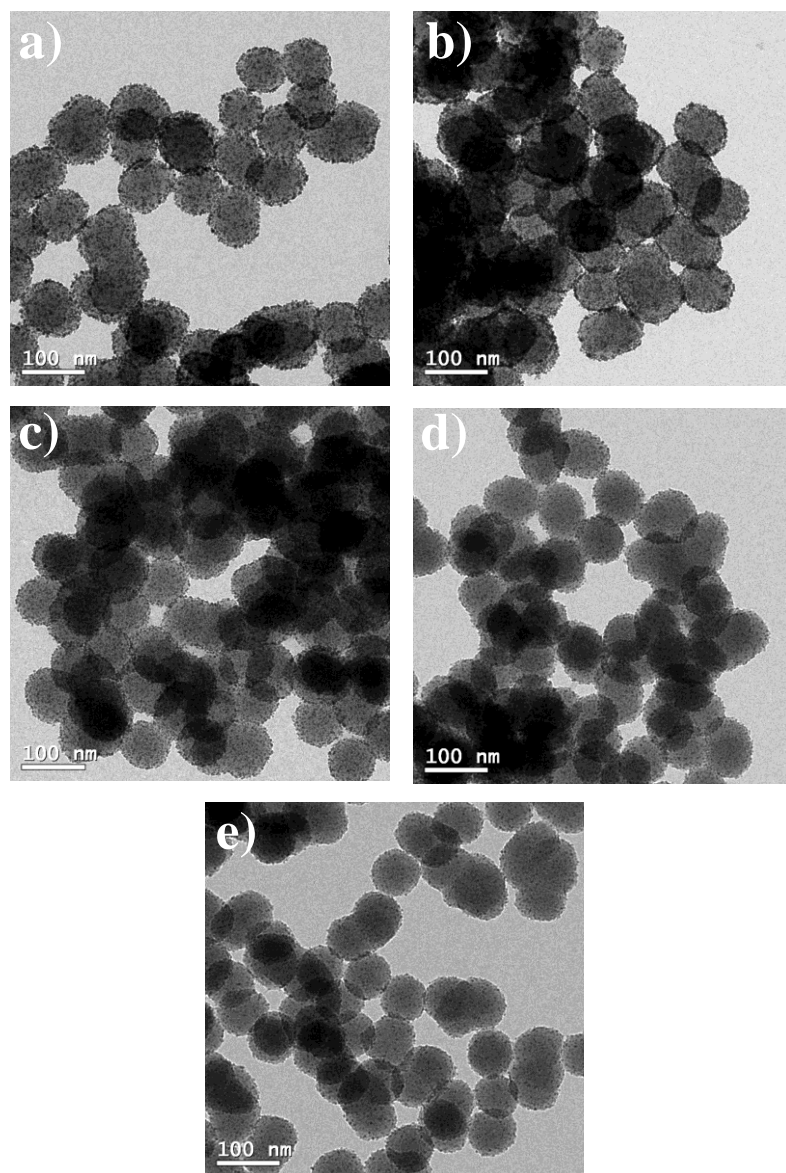


Figure S1. TEM images of SiO₂@Pt NCs: a) NC_1, b) NC_2, c) NC_3, d) NC_4, and e) NC_5 at 30 000 magnification.

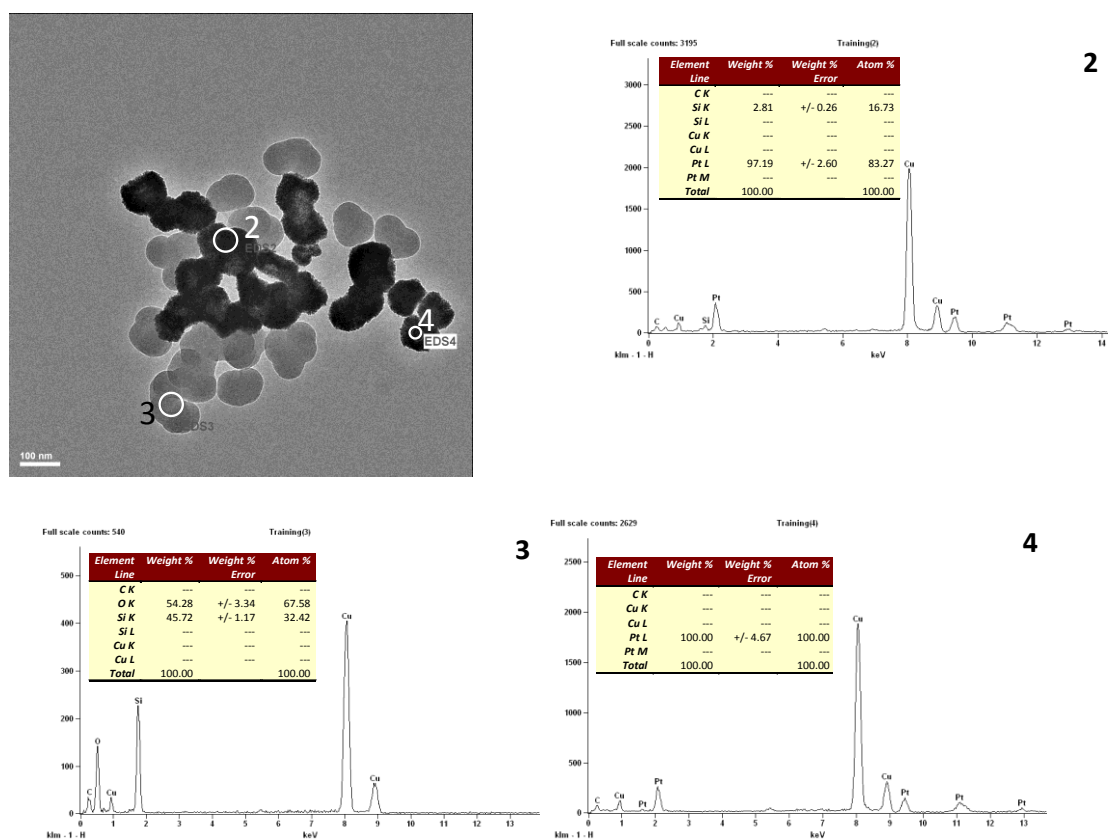


Figure S2. TEM image and corresponding EDS analysis of non-modified silica@Pt material (control experiment).

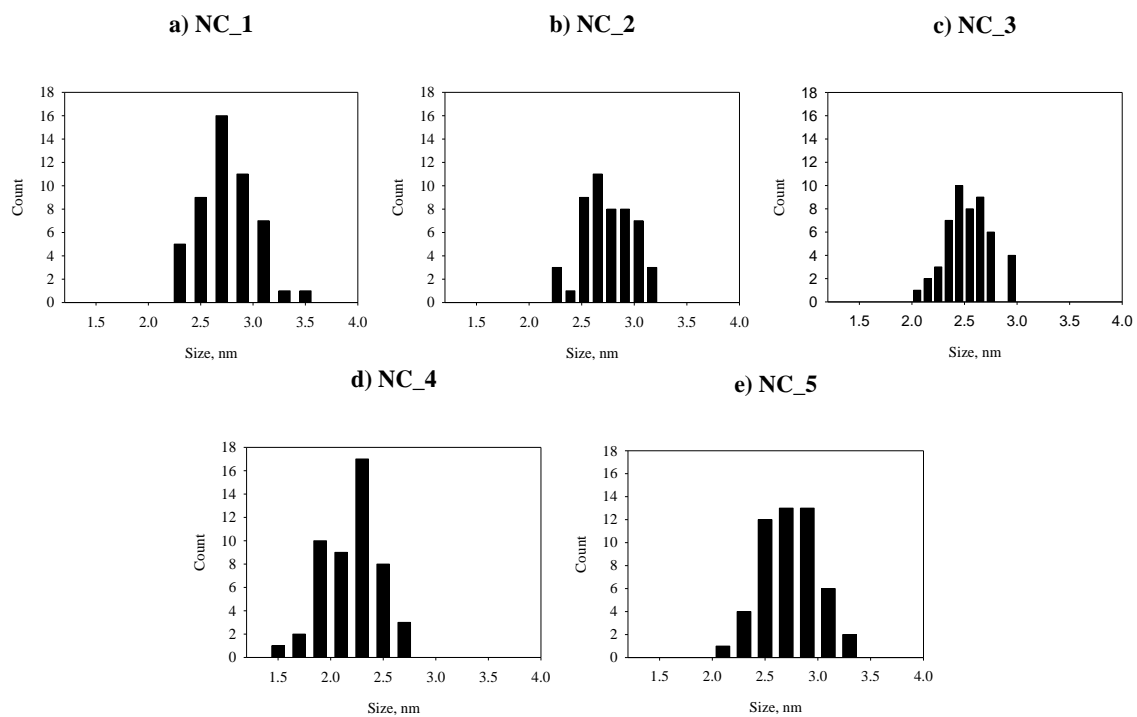


Figure S3. Size distributions graphs for SiO₂@Pt NCs: a) NC_1, b) NC_2, c) NC_3, d) NC_4, and e) NC_5.

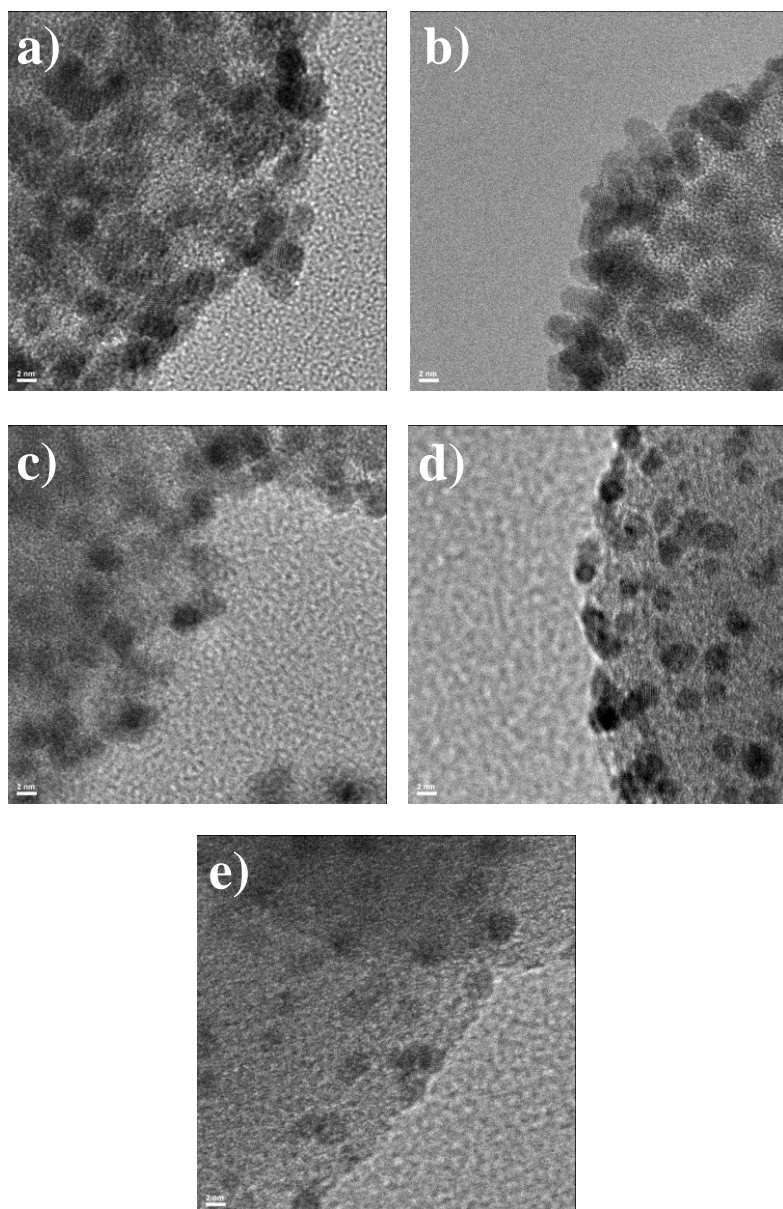


Figure S4. HR-TEM images of SiO₂@Pt NCs: a) NC_1, b) NC_2, c) NC_3, d) NC_4, and e) NC_5 at 12000000 magnification.

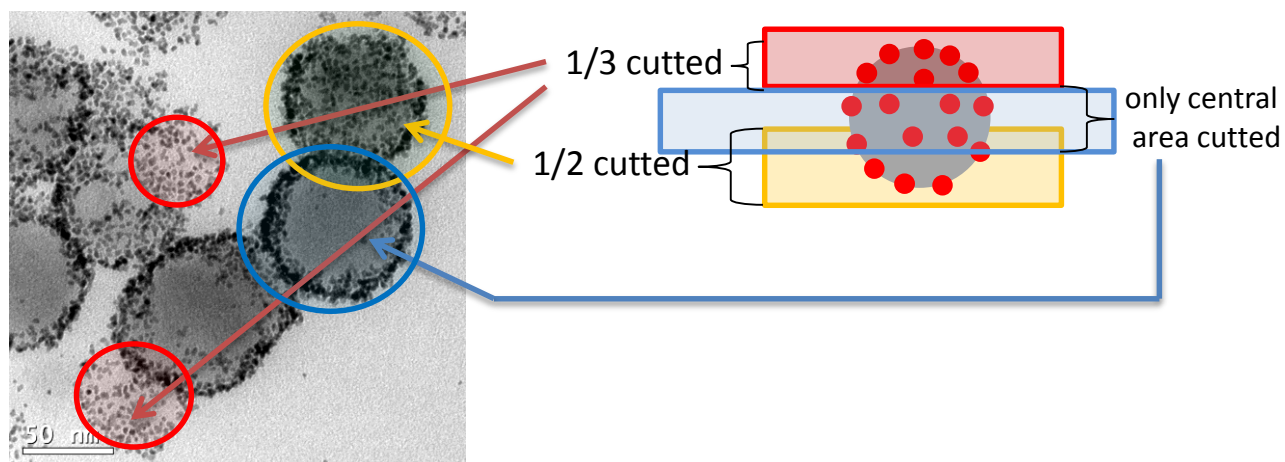


Figure S5. Cross-sectional TEM images of NC_2.

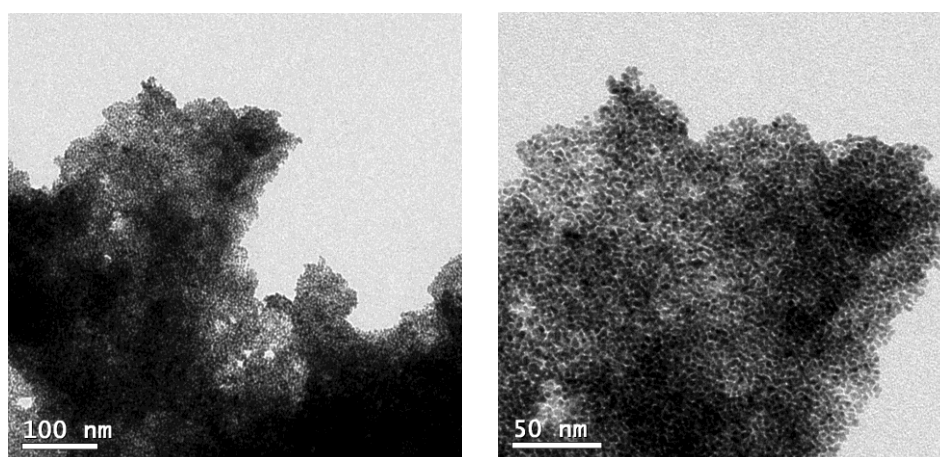


Figure S6. TEM images of NC_2 after HF etching.

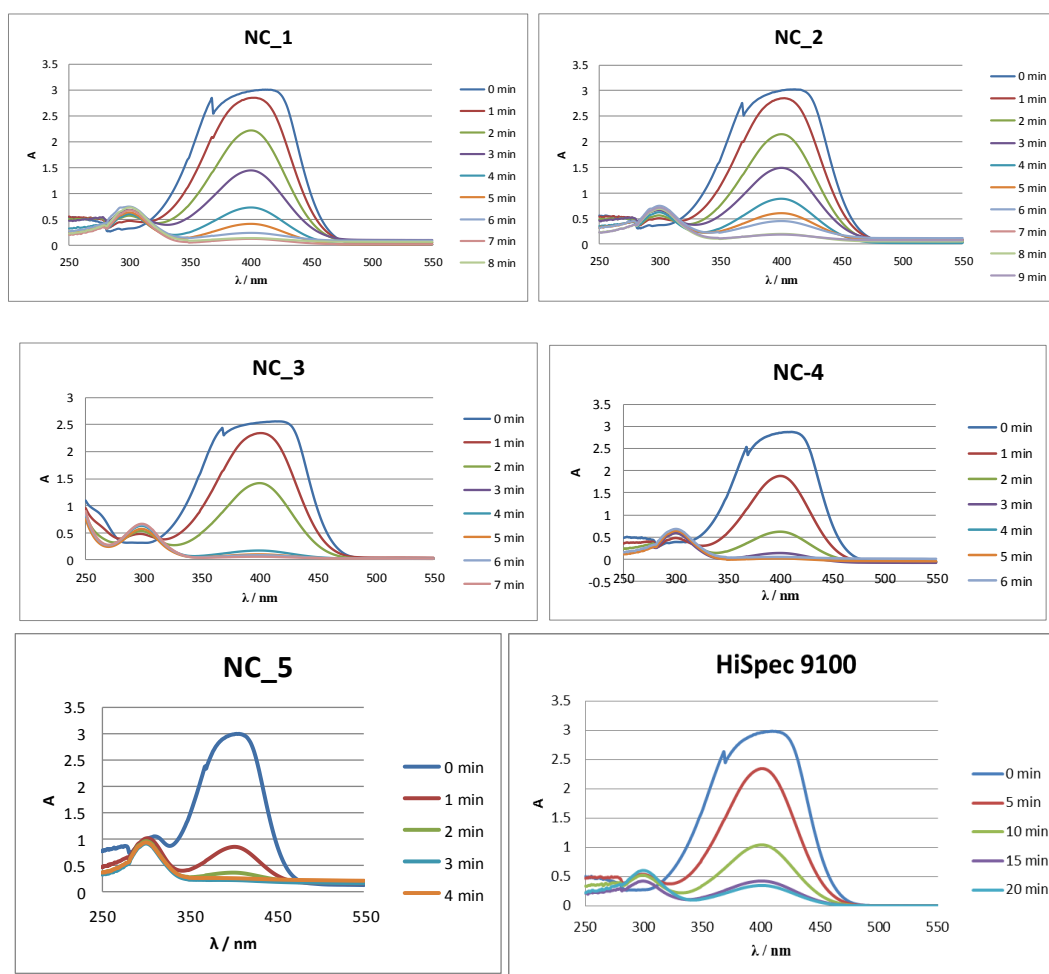


Figure S7. Hydrogenation of 4-nitrophenol by NC_1-5 and HiSpec 9100. The hydrogenation activity was measured by the UV-Vis spectral changes and the rate constants were subsequently calculated.

(1) B. H. San, S. Kim, S. H. Moh, H. Lee, D.-Y. Jung and K. K. Kim, *Angew. Chem. Int. Ed.*, **2011**, 123, 12130-12135.