

Supporting Information

Facile preparation of small and narrowly distributed platinum nanoparticles in the absence of H₂ from Pt(II) and Pt(0) molecular precursors using trihydrogeno(octyl)silane.

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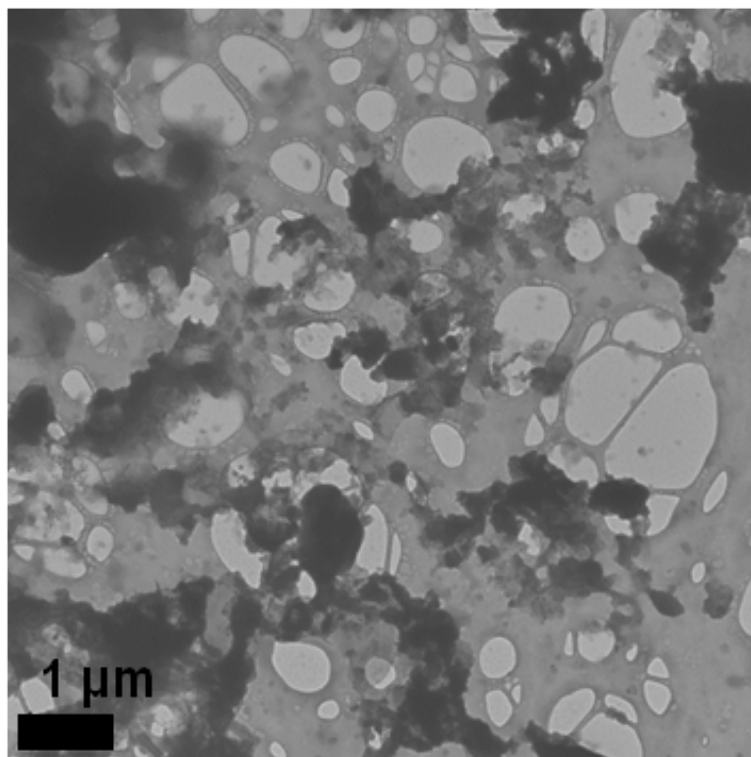
Liquid State NMR – Kinetic experiments

A solution (**A**) of $\text{CODPt}(\text{OSi}(\text{O}i\text{Bu})_3)_2$ at 24mmol.L^{-1} was prepared in THF-d^8 along with a solution (**B**) of trihydrogeno(octyl)silane at 24mmol.L^{-1} also in THF-d^8 . Under Inert atmosphere 0.5 mL of **A** was placed in a Young NMR tube. The final concentration in the tube is thus 12mmol.L^{-1} corresponding to 10 mg of platinum precursor assuring a proper NMR signal. This concentration is 8 times the one used for the synthesis of nanoparticle in schlenks. After freezing in liquid nitrogen, still under inert atmosphere 0.5 mL of **B** was added in the NMR tube. Before introducing the NMR tube in the spectrometer it was heating up to 0°C in an ice water bath and quickly dried with paper. The direct transfer from liquid nitrogen to the spectrometer would have resulted in water condensed on the tube walls and thus poorly resolved spectra.

Chemicals

Silica used for nanoparticles impregnation was obtained as follow: silica (Aerosil Degussa, $200\text{m}^2.\text{g}^{-1}$) was compacted with distilled water, dried at 110°C for 2 days and finally calcined (500°C under air for 4 hours).

Figure S1. TEM micrographs and particle size distribution of colloid prepared from (COD)Pt(Me)₂ and trihydrogeno(octyl)silane (ratio Si/Pt=1)



Si/Pt ratio of 1, 60°C, 48 hrs.

Figure S2. TEM images of Pt NP synthesized from $\text{CODPt}(\text{OSi}(\text{O}^t\text{Bu})_3)_2$, c) 1 equiv. octylsilane, RT, 30 min., d) 1 equiv. trihydrogeno(octyl)silane, RT, 15 hrs.

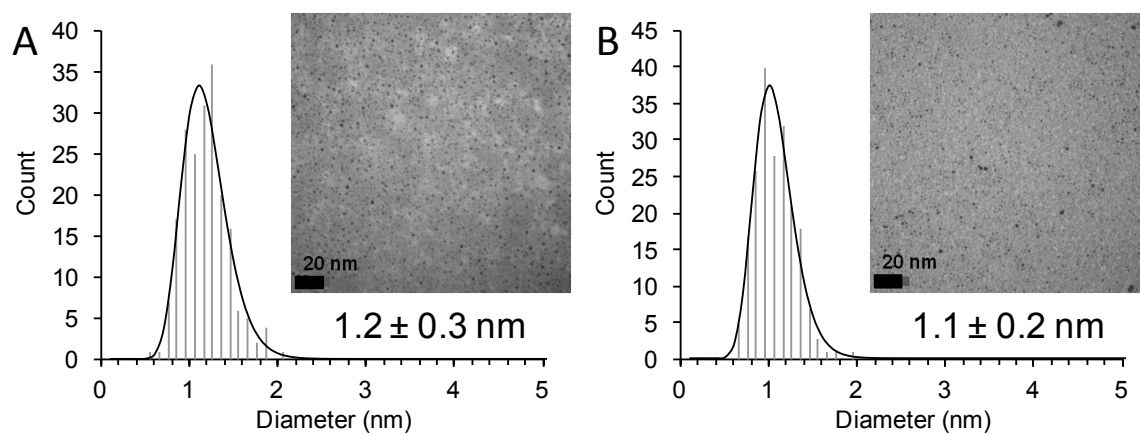
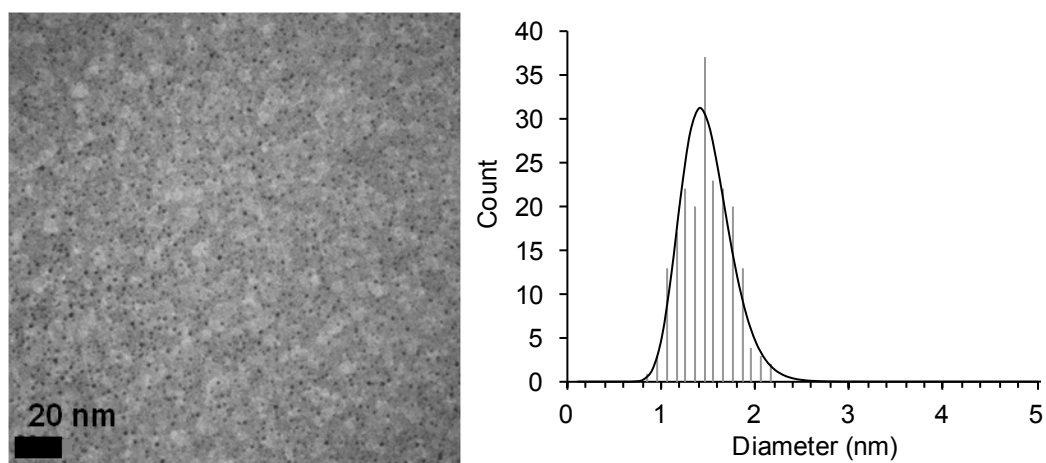
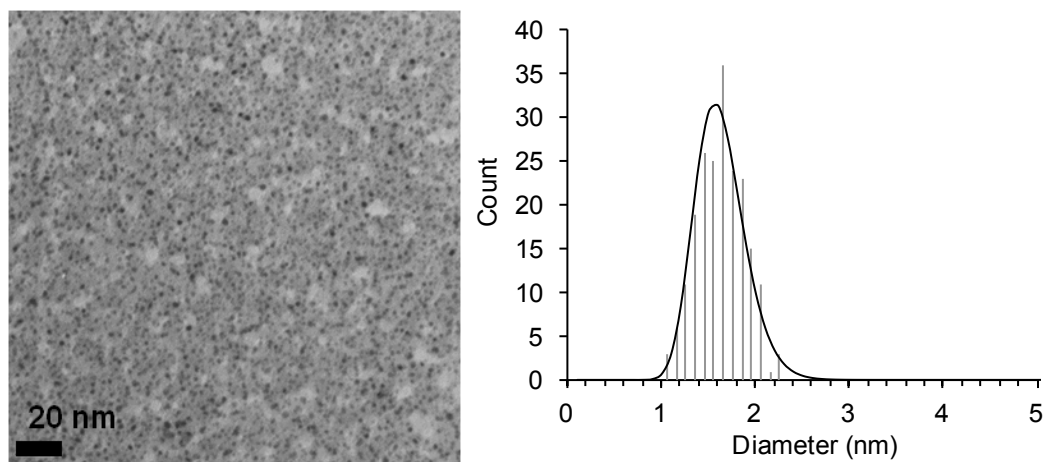


Figure S3. TEM micrographs and particle size distribution of colloid prepared from Pt(dba)₂ and trihydrogeno(octyl)silane (ratio Pt/Si=1)



After 60 min reaction at 60°C: 1.5 nm, $\sigma = 0.3$ nm



After 15 hours reaction at 60°C: 1.6 nm, $\sigma = 0.3$ nm

Figure S4. In situ ^1H NMR spectra of the formation of Pt nanoparticles from $(\text{COD})\text{Pt}(\text{OSi}(\text{OtBu})_3)_2$ and trihydrogeno(octyl)silane ($\text{Si}/\text{Pt}=1$) at RT in THF-d_8 . The “*” indicates THF signal.

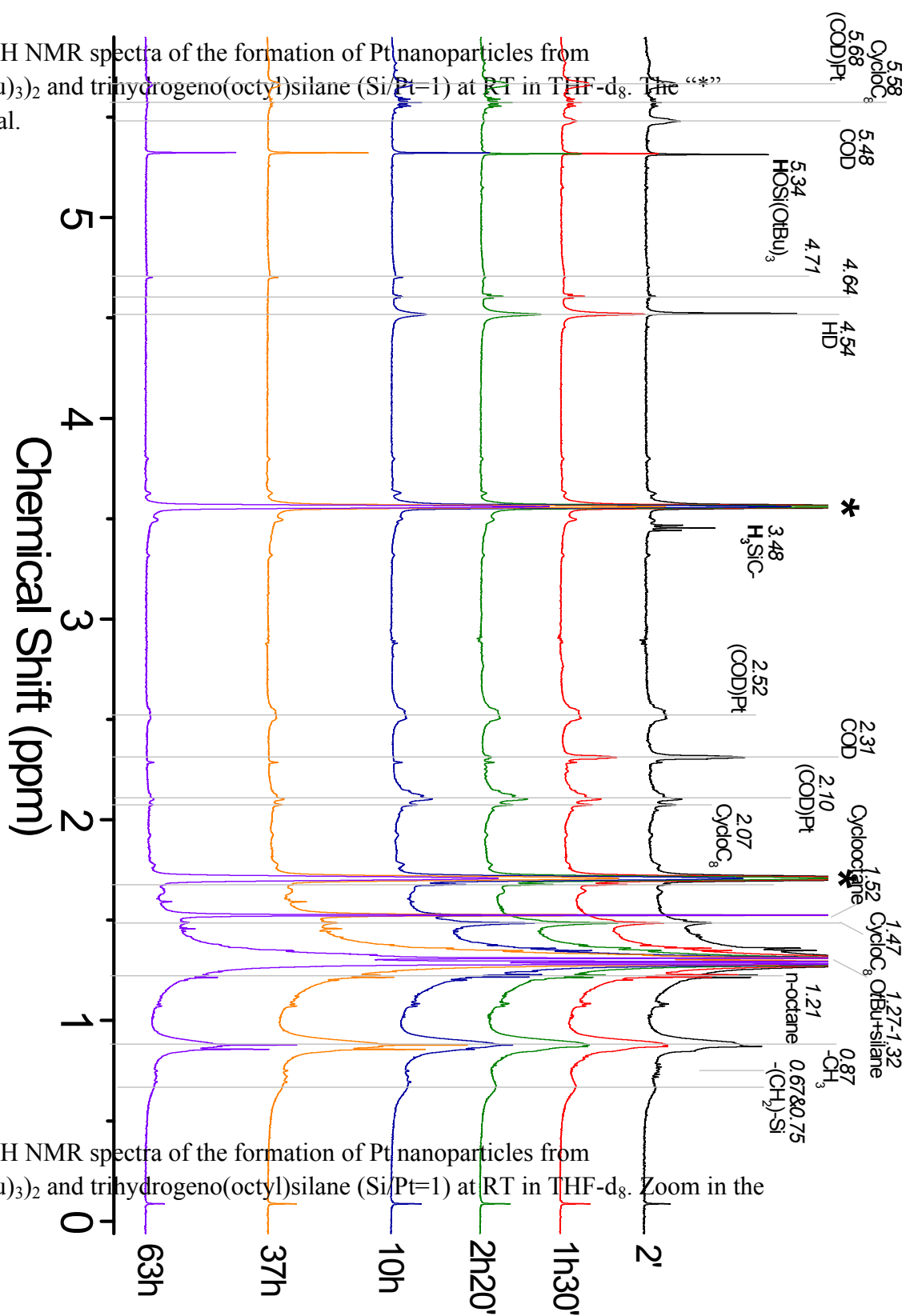


Figure S5. In situ ^1H NMR spectra of the formation of Pt nanoparticles from $(\text{COD})\text{Pt}(\text{OSi}(\text{OtBu})_3)_2$ and trihydrogeno(octyl)silane ($\text{Si}/\text{Pt}=1$) at RT in THF-d_8 . Zoom in the 1.1-1.6 ppm range.

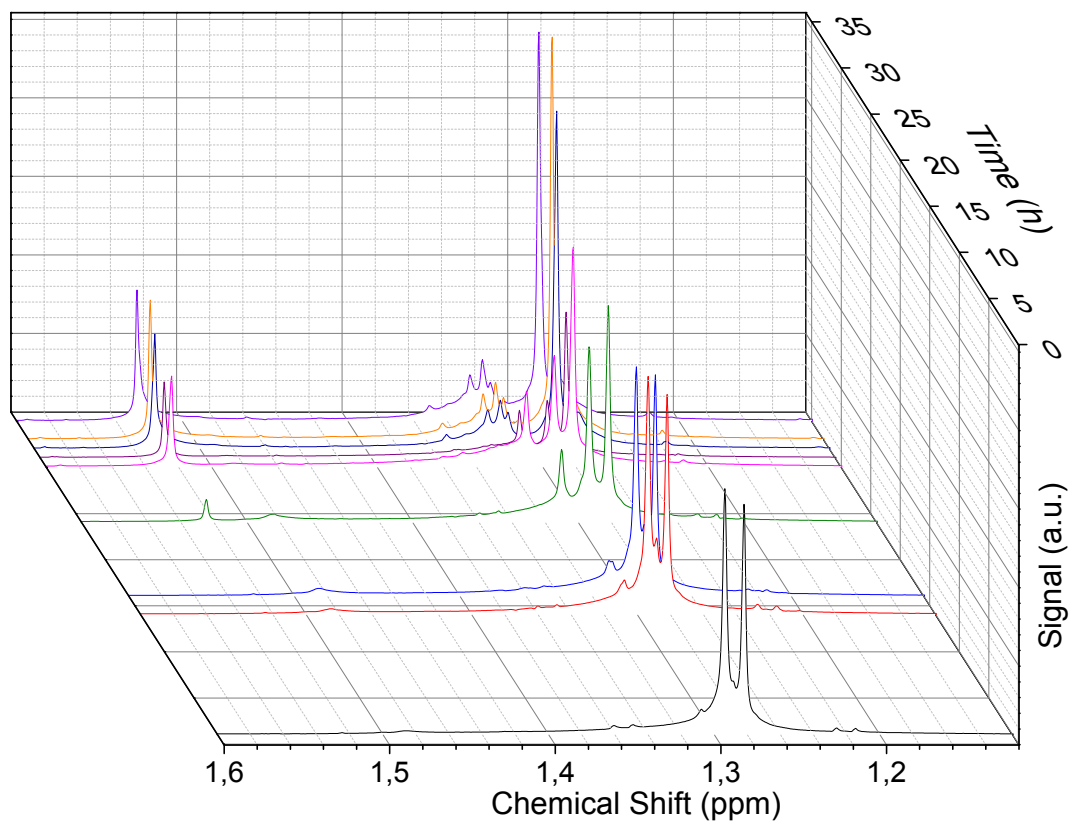


Figure S6. THF subtracted IR spectra of a) (COD)Pt(OSi(OtBu)₃)₂, b) COD, c) HOSi(OtBu)₃, d) 1 equiv. C₈H₁₇SiH₃ at 60°C e) C₈H₁₇SiH₃.

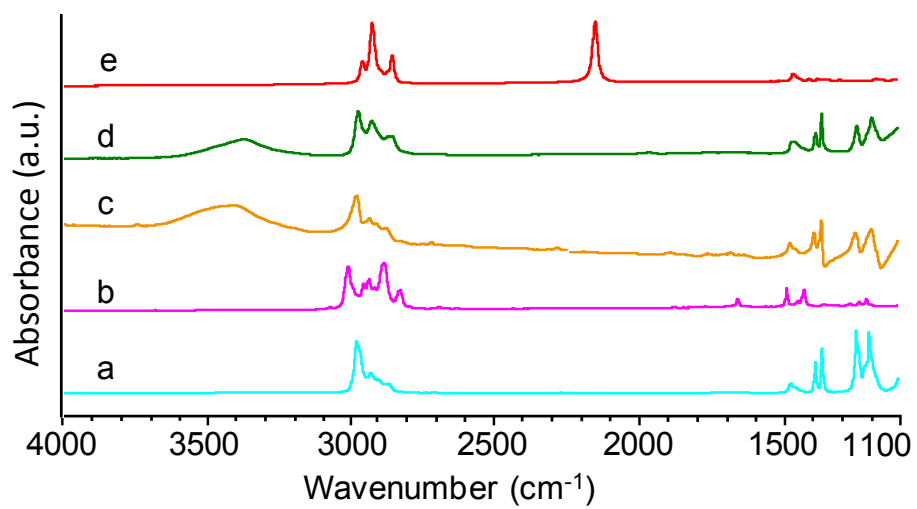


Figure S7. IR spectra of colloid prepared from $(\text{COD})\text{Pt}(\text{OSi}(\text{O}t\text{Bu})_3)_2$ at 60°C impregnated on silica a) dried at 120°C , b) after calcination in air at 320°C , c) after reduction in H_2 at 500°C , d) trihydrogeno(octyl)silane, e) $\text{HOSi}(\text{O}t\text{Bu})_3$ absorbed onto silica.

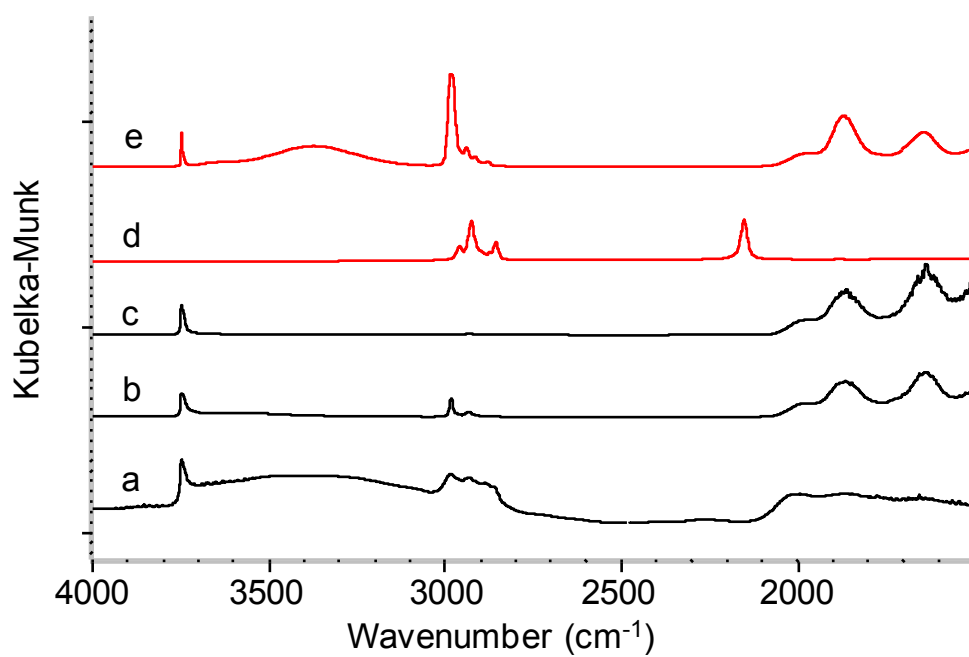


Figure S8. TEM images of platinum nanoparticles prepared from $(\text{COD})\text{Pt}(\text{OSi}(\text{O}t\text{Bu})_3)_2$ at 60°C supported on silica. a- after impregnation of the colloid on silica; b- calcined at 320°C in air; c- after reduction under H_2 at 500°C .

