Supporting Information for

Morphology, Stability, Structure, and CO₂-Surface Chemistry of Micelle Nanolithographically Prepared Two Dimensional Arrays of Core-Shell Fe-Pd Multicomponent Nanoparticles

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Figure S1: The EXAFS spectrum fitting (in R space) after adding one Pd atom at different distances with respect to the centre Fe atom of the γ -Fe₂O₃ structure. The Fe-Pd multicomponent NP sample was obtained after high temperature annealing. Respective R_{factor} is also given.

Figure S2: The EXAFS spectrum fitting (in R space) after adding one Pd atom at different distances with respect to the centre Fe atom of the Fe_3O_4 structure. The Fe-Pd multicomponent NP sample was obtained after high temperature annealing. Respective R_{factor} is also given.

Figure S3: The EXAFS spectrum fitting (in R space) after adding one Pd atom at different distances with respect to the centre Fe atom of the FeO(OH) structure. The Fe-Pd multicomponent NP sample was obtained after high temperature annealing. Respective R_{factor} is also given.

Figure S4: SEM image of the Fe-Pd multicomponent NPs obtained after high temperature annealing under UHV. These NPs were deposited onto UHV-clean $\text{TiO}_2(110)$ support surface.

Figure S5: Temperature programmed desorption (TPD) of O_2 from single crystal Pd(100) surface. O_2 was dosed to single crystal Pd(100) surface at room temperature (~ 300 K). The ramp rate was 4.4 K/s.

Figure S6: X-ray photoelectron spectrum of single component iron oxide and palladium nanoparticles synthesized following the same Micelle nanolithography procedure which was used to synthesize Fe-Pd multicomponent nanoparticles. (a) The Fe 2p and (b) Pd 3d regions are shown after completely cleaning the NP surfaces under UHV conditions. Here, “sat.” refers to the satellite peak. Pd-oxides are mostly decomposed, resulting in 87% metallic Pd⁰ species and 13% oxidized Pd⁺² species.

Figure S7: Temperature programmed desorption (TPD) of CO from TiO₂(110)-supported Fe-Pd multicomponent nanoparticle surface during the CO₂-TPD measurement. Prior to this measurement the NP surfaces were saturated with CO₂.