

Shape-controlled continuous synthesis of metal nanostructures

Article

Supplemental Material

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Shape-Controlled Continuous Synthesis of Metal Nanostructures

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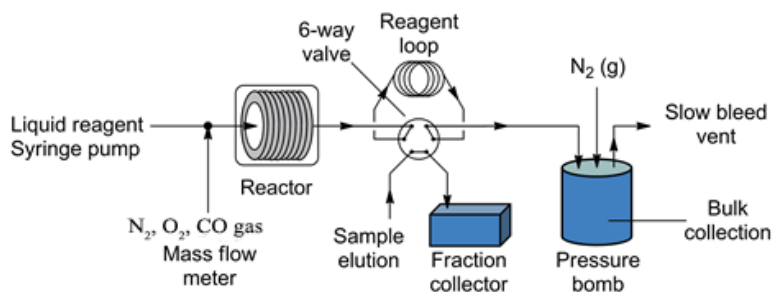


Fig S1. Microfluidic system set up.

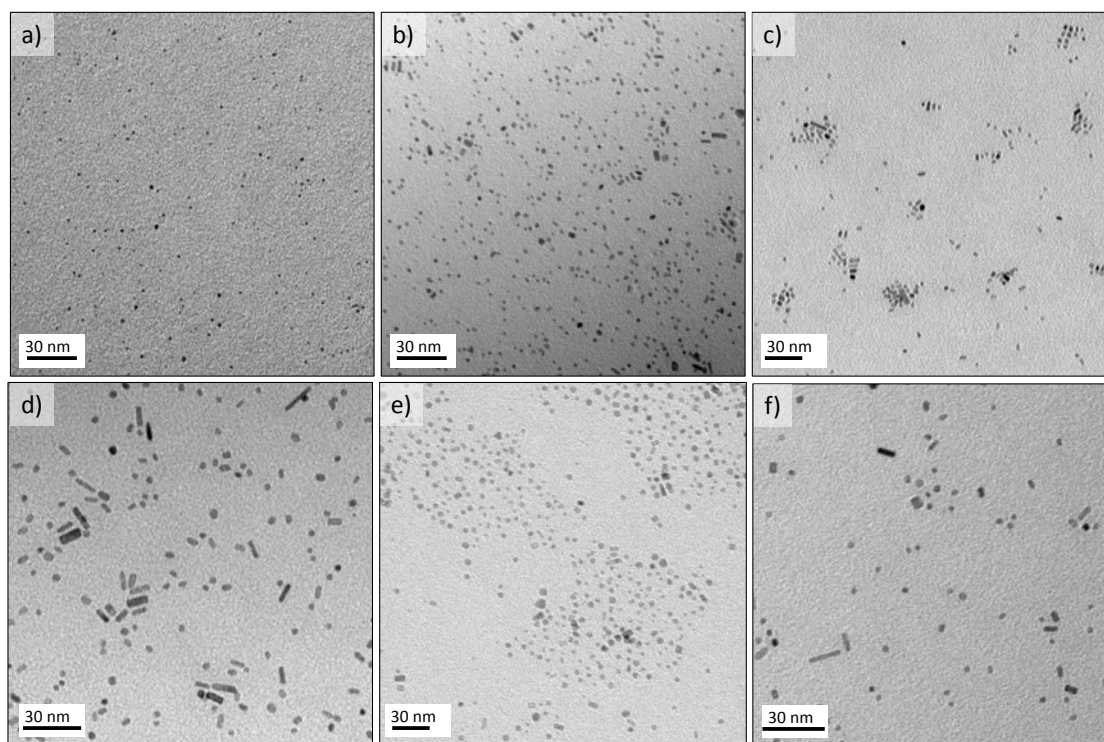


Fig. S2.-TEM images of Pd nanostructures obtained without liquid segmentation at different conditions $L_2/L_1 = 1.8$: a) 10 s, 160°C; b) 30 s, 160°C; c) 60 s, 160°C; d) 120s, 160°C; e) 120s, 130°C; f) 120s, 190°C.

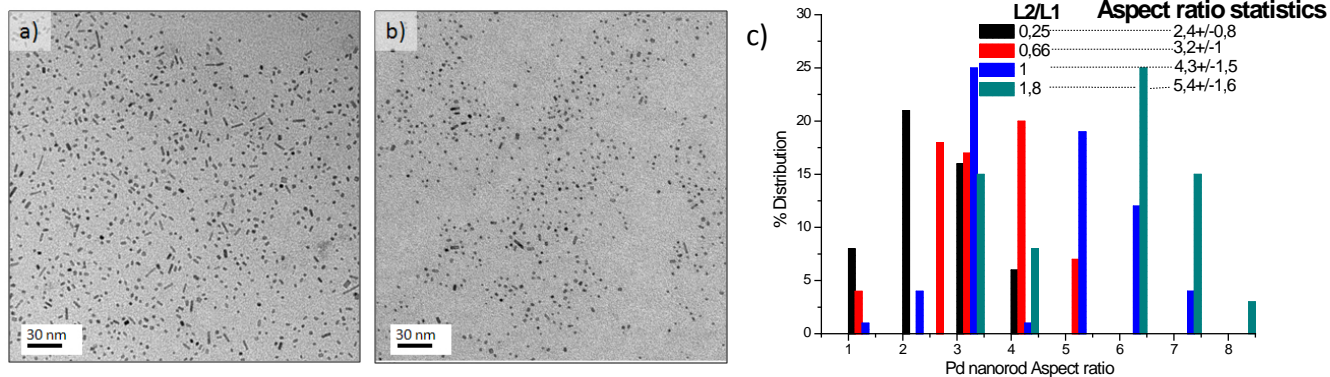


Fig. S3.-TEM images of Pd nanostructures obtained in oxygen segmented flow ($O_2/\text{liquid} = 3.5/1$), 160°C , 120s, with different L_2/L_1 ratios: a) 4/1, b) 9/1.c) Statistic diagram from Pd nanorods obtained in oxygen segmented flow (oxygen/liquid= 3.5) at residence time of 120 s and reaction temperature 160°C at different L_2/L_1 ratios: 0.25- 1.8

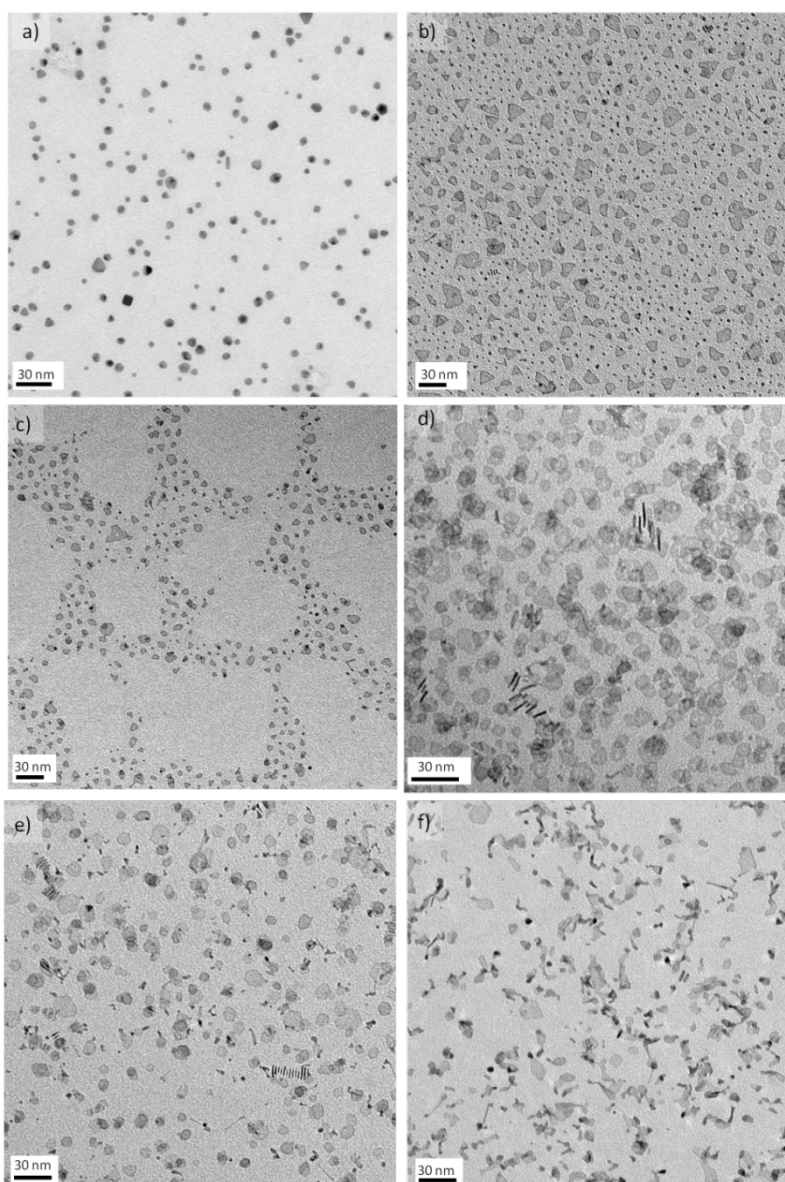


Fig. S4.-TEM Images of Pd nanostructures obtained in a microfluidic reactor: (a) Pd nanoparticles obtained without CO slug flow (laminar flow) at 90°C , residence time = 150 s. Pd nanostructures obtained with CO slug flow, residence time = 150 s: (b) 35°C , (c) 50°C , (d) 90°C , (e) 130°C and (f) 170°C .

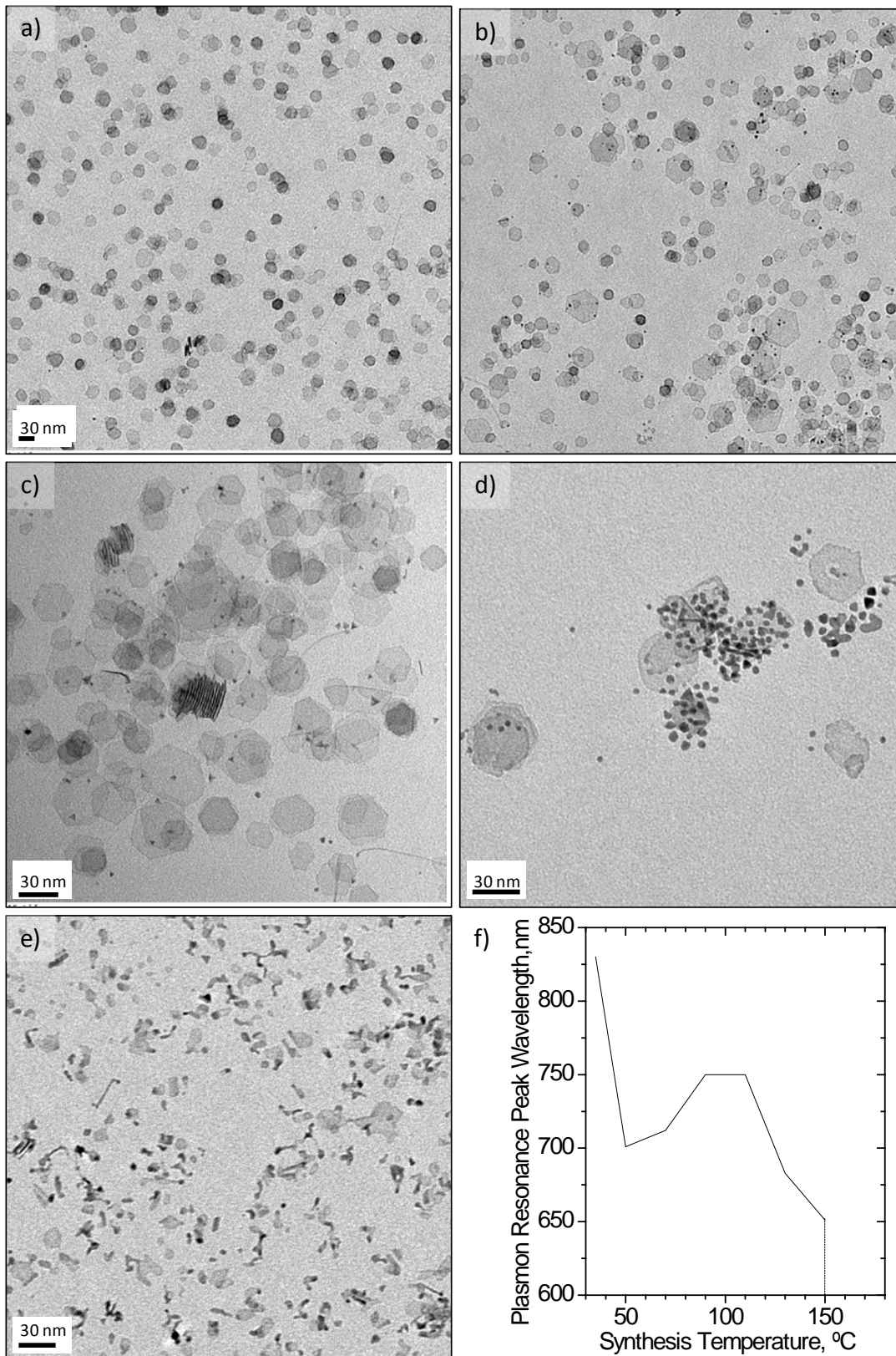


Fig. S5.- TEM images of palladium nanosheets obtained with carbon monoxide segmentation and liquid segments containing DMF and TTAB, 150 s residence time at : (a) 90 °C, low magnification image, (b) 130 °C, low magnification image, (c) 130 °C detail image, (d) 150 °C, detail image, (e) 170 °C, detail view. (f) Representation of Plasmon Resonance Peak wavelength of Pd nanostructures versus synthesis temperature.

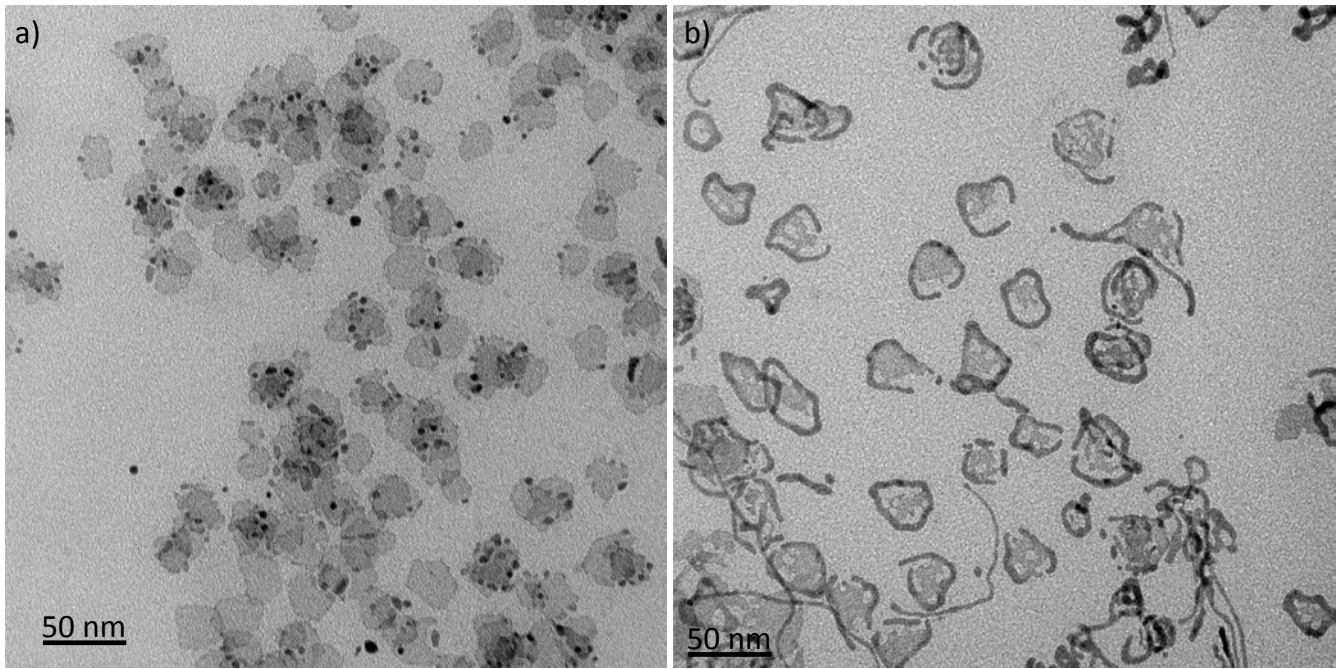


Fig. S6.-TEM images of palladium nanosheets obtained with carbon monoxide segmentation and liquid segments containing DMF and TTAB, 150 s residence time at 90 °C. A) After 5 days of production. B) After 2 weeks of production

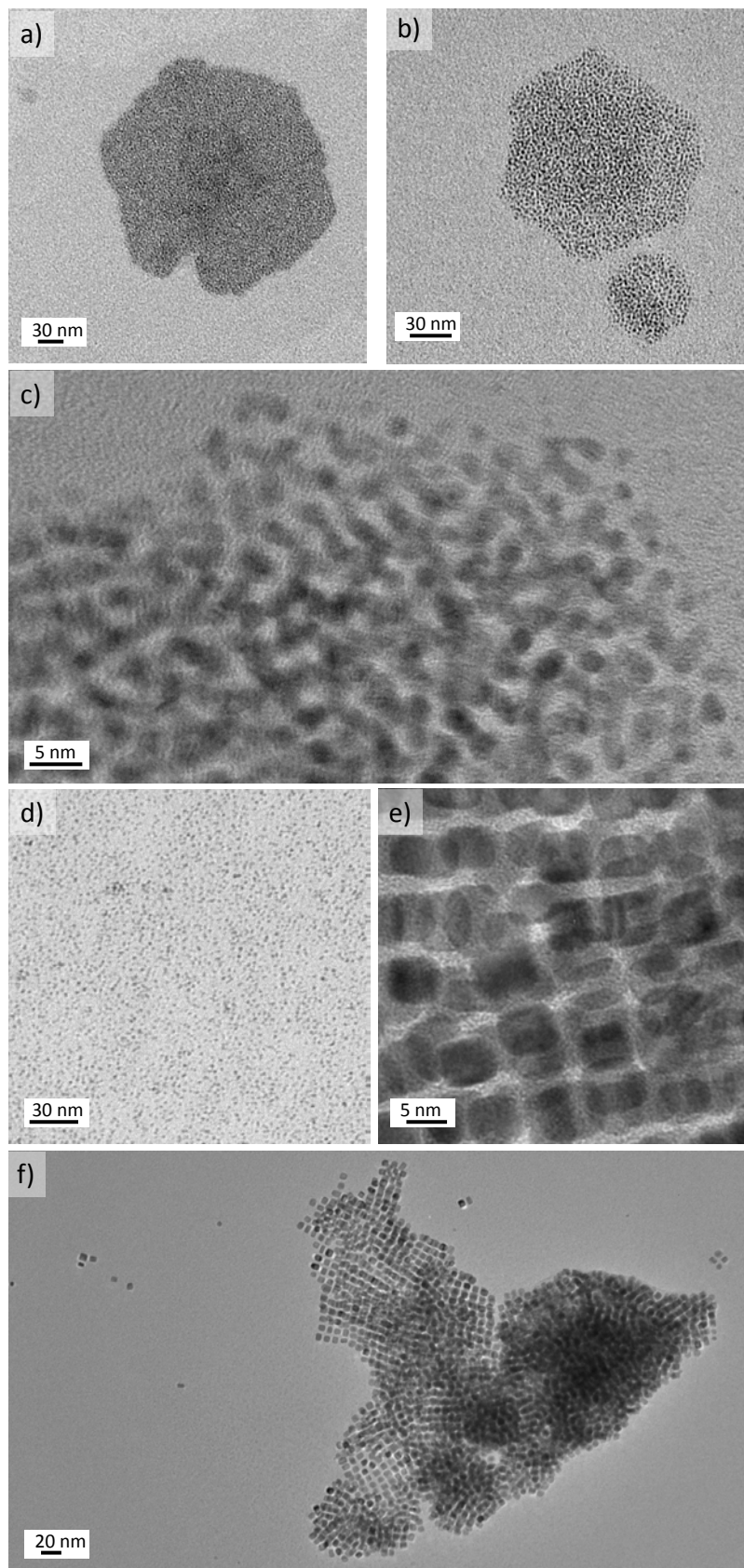


Fig. S7. a) TEM image of Pt clusters obtained under the aqueous route at 70 °C, $P_{co} = 120$ psi and residence time = 150 s. b) TEM image of Pt clusters obtained under the aqueous route at 100 °C, $P_{co} = 120$ psi and residence time = 150 s. c) HRTEM image from a hexagonal assembly of Pt clusters obtained under conditions describes in b). d) TEM image of Pt clusters obtained under the aqueous route at 160 °C, $P_{co} = 120$ psi and residence time = 150 s. e-f) HRTEM images of self-assemble Pt nanocubes obtained under the non aqueous route at 200 °C, OAm/OAl = 3.8, OLA/Pt = 230, $P_{co} = 120$ psi and residence time = 150 s

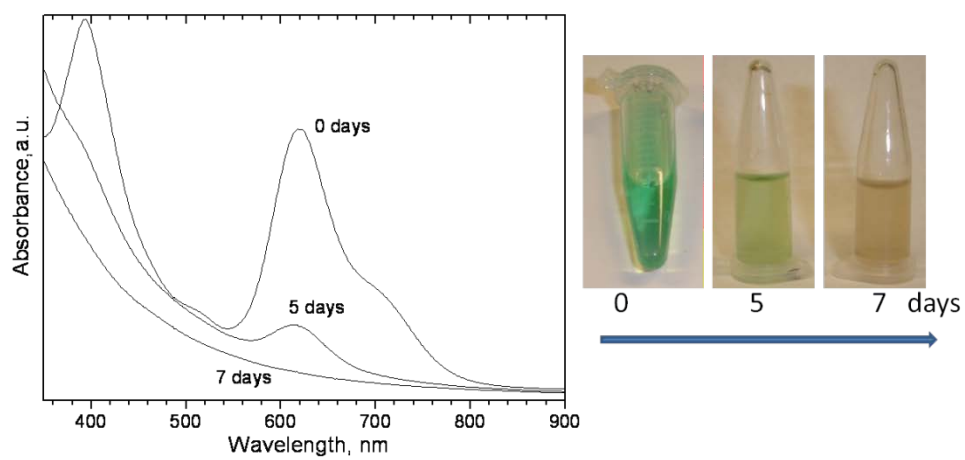


Figure S8. UV-Vis spectra of the clusters obtained in the aqueous route at 125 °C and a residence time of 150 s. UV-Vis measurement of as-synthesized Pt nanostructures and after 5 and 7 days. Photographs of Pt nanostructures optical appearance as a function of time.