Electronic Supplementary Information

# Facile synthesis of self-assemblies of ultrathin round Pd nanosheets or nanorings and their enhanced electrocatalytic activities

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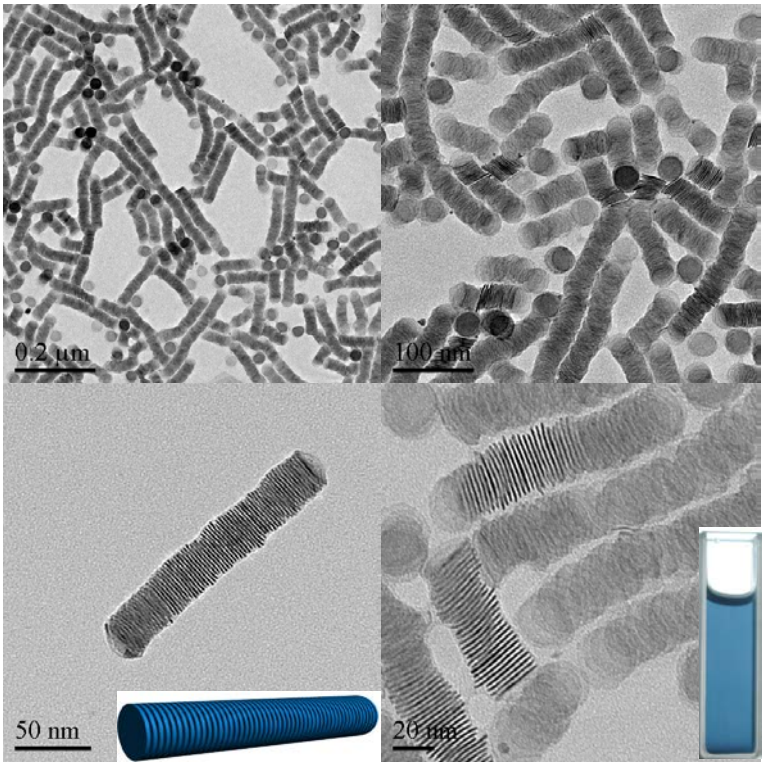


**Fig. S1** TEM image with different scales of the as-prepared self-assemblies of ultrathin round Pd nanosheets. The molar ratio of $Pd(acac)_2$/PVP/KI/NaAc was 1/9/4/4 and the concentration of $Pd(acac)_2$ was 6.8mM

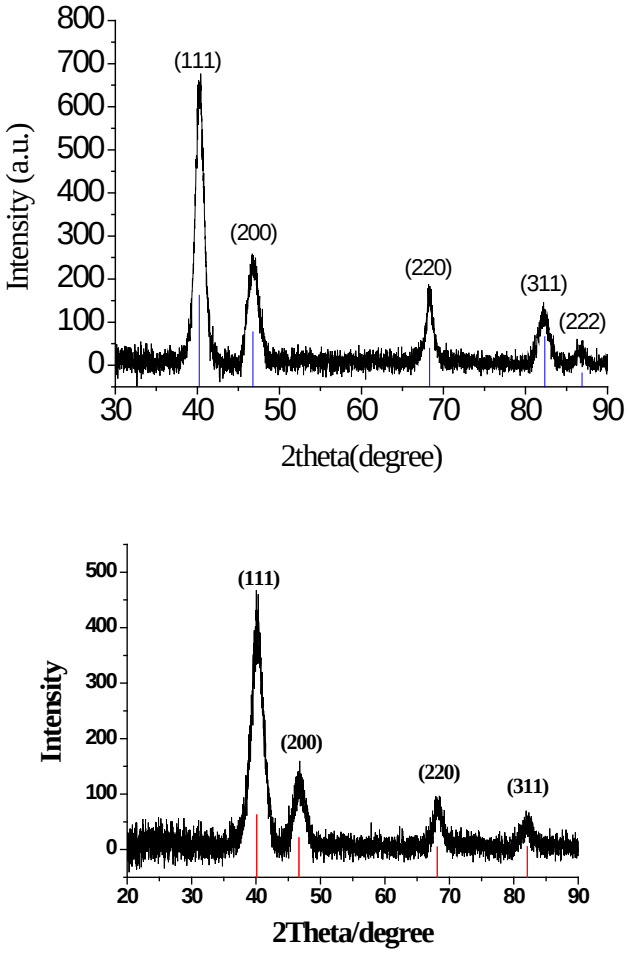


**Fig. S2** XRD patterns of the self-assemblies of round ultrathin Pd nanosheets

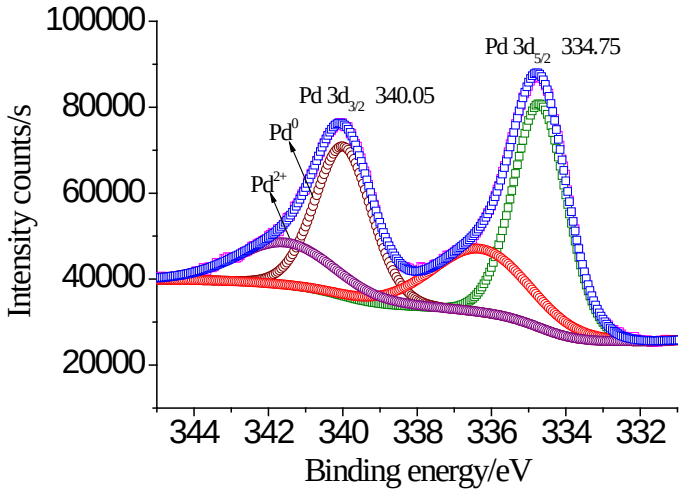


**Fig. S3** XPS spectrogram of the self-assemblies of round ultrathin Pd nanosheets

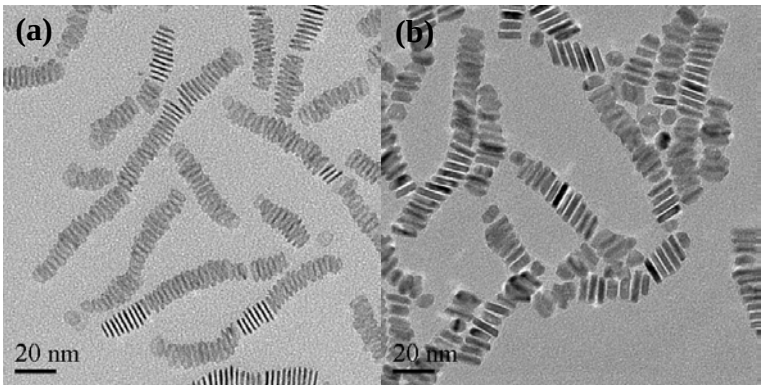


**Fig. S4** TEM images of Pd nanoparticles obtained at different temperatures. (a) 80°C; (b) 120°C

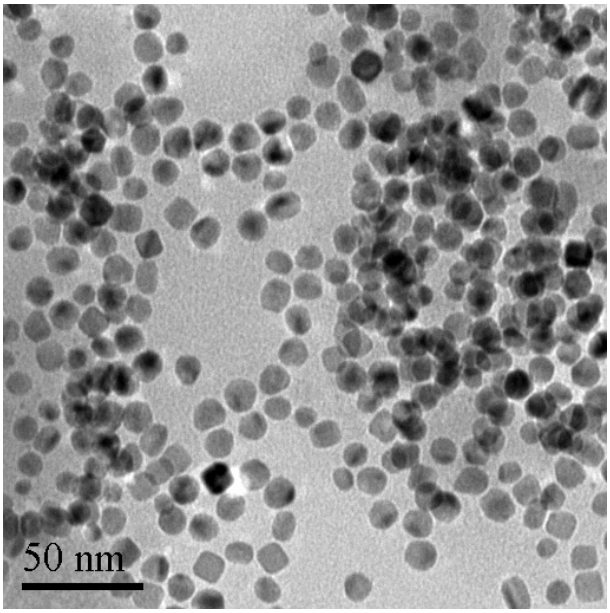


**Fig. 5S** TEM images of Pd nanoparicles prepared in the absence of CO.

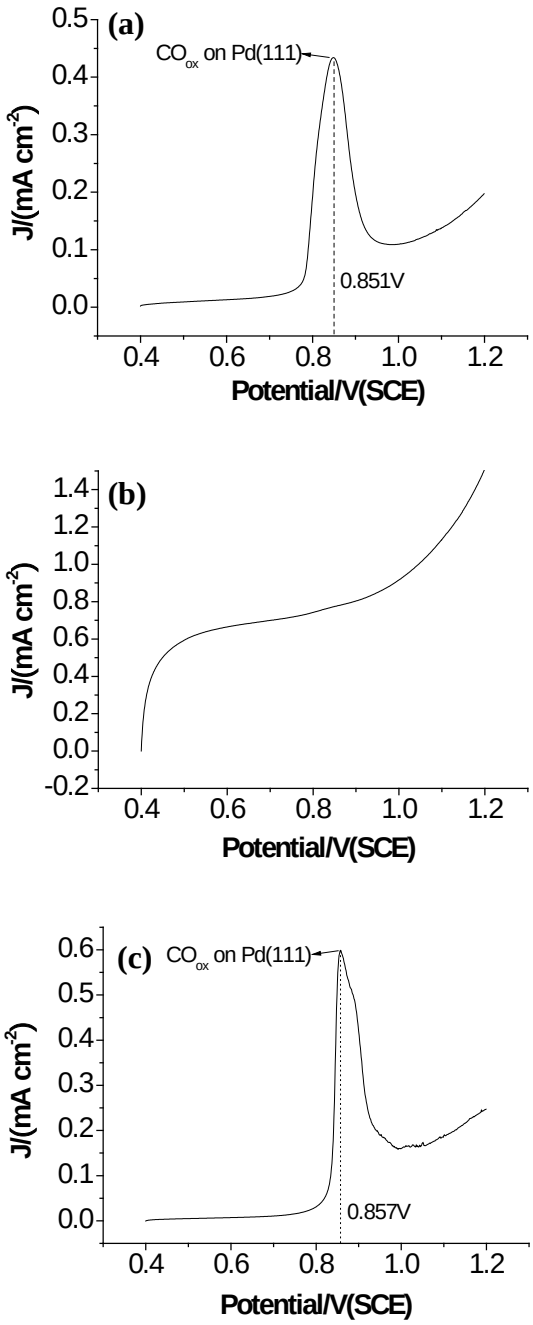


**Fig. S6** CO stripping voltammetry of the Pd nanosheet self-assemblies in 0.1 M $H_2SO_4$ solution. (a) The freshly-prepared Pd nanosheet self-assemblies without introducing any additional CO; (b) the second potential scanning; (c) after dosing CO for 15 min for clean Pd nanosheet self-assemblies.

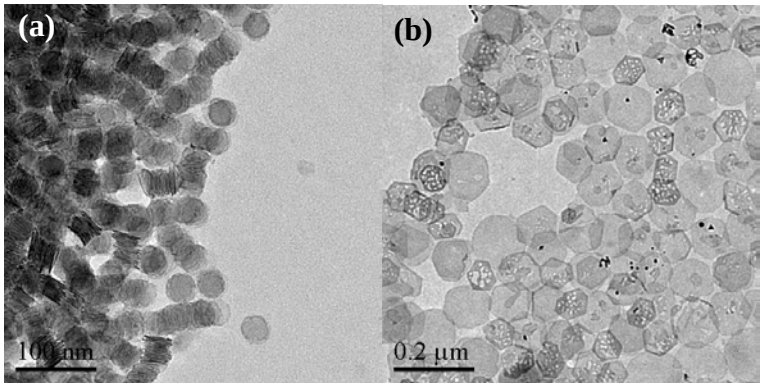


**Fig. S7** TEM images of the products prepared in the presence of sodium benzoate (a) or sodium oxalate (b) instead of sodium acetate.

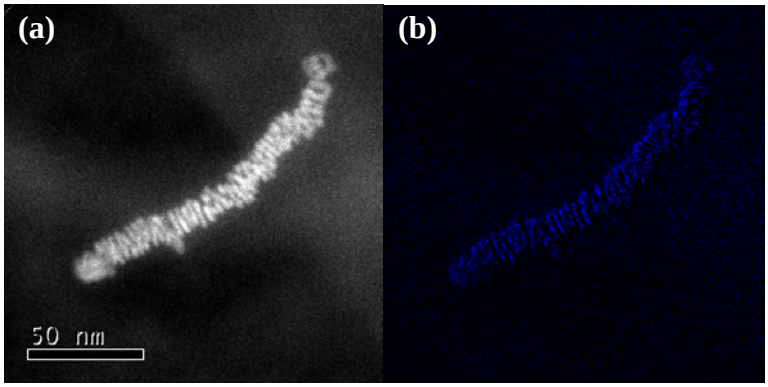


**Fig. S8** HAADT-STEM image (a) of a single Pd nanosheet self-assembly and the corresponding EDX mapping image of $I^-$ ions (b).

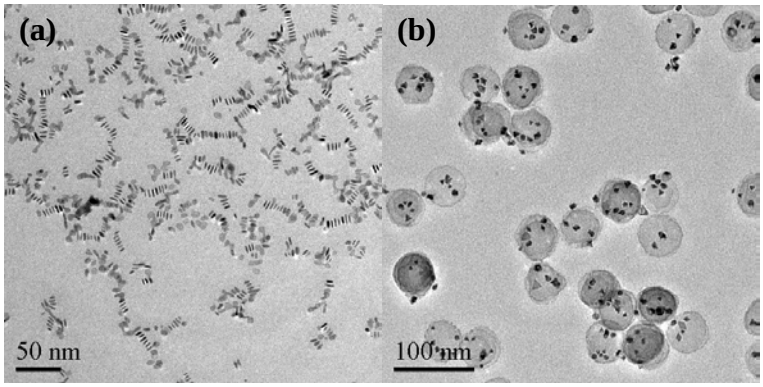


**Fig. S9** TEM images of the products obtained with adding different amount of KI. The molar ratio of $Pd(acac)_2$/PVP/KI/NaAc: (a) 1/9/2/4; (b) 1/9/8/4.

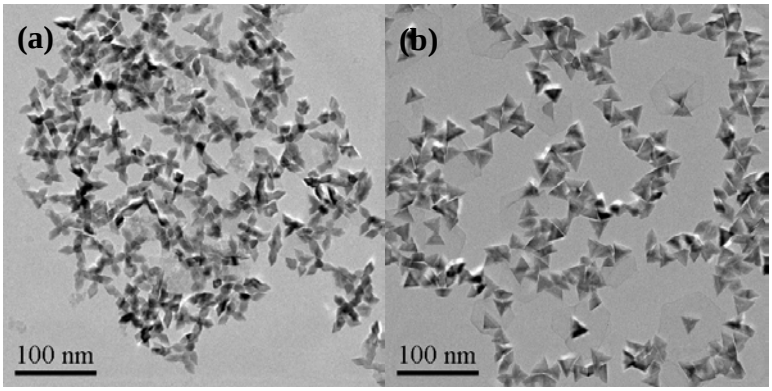


**Fig. S10** TEM images of the Pd nanocrystals with adding others halogen. (a) KCl; (b)KBr

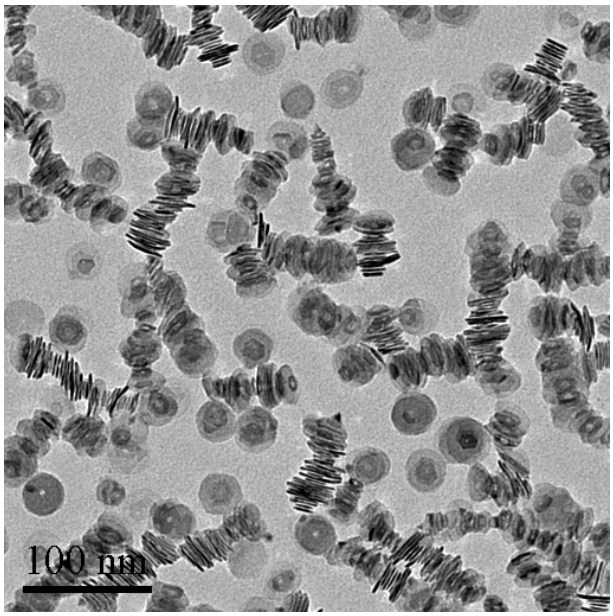


**Fig. S11** TEM image of the product prepared under CO reducing atmosphere at a reaction of 4 h.

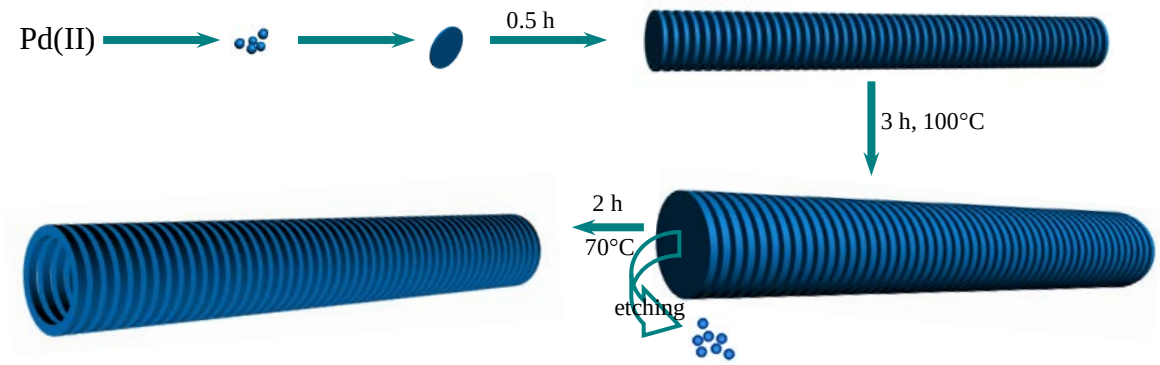


**Fig. S12** Schematic illustrations of the formation procedure and shape evolution of self-assemblies of ultrathin Pd nanosheets and nanorings.

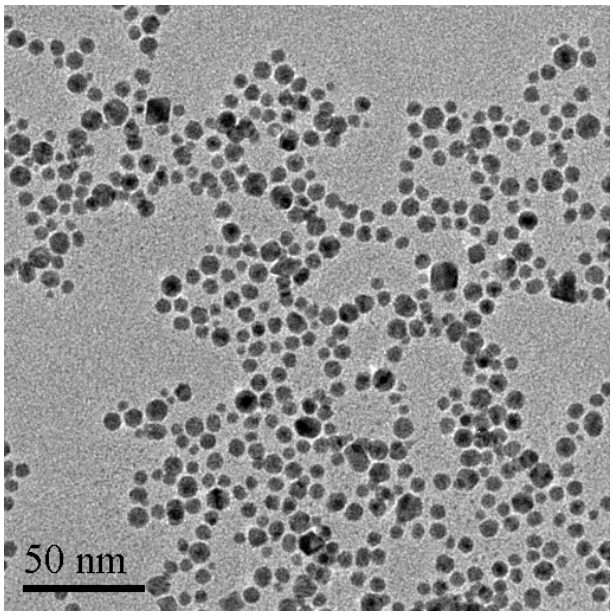


**Fig. S13** TEM image of small Pd nanoparticles. The mean size was 5 nm.

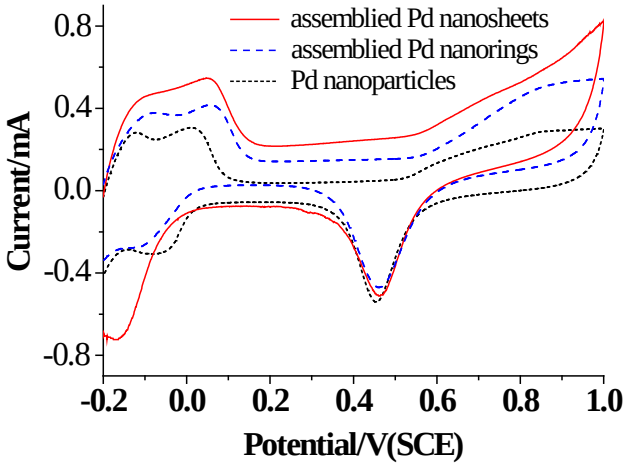


**Fig. S14** Cyclic voltammograms of different Pd catalysts in 0.5 M $H_2SO_4$ + 0.5 M HCOOH solution at a scan rate of 50 $mV \cdot s^{-1}$ between -0.2 and 1.0 V.

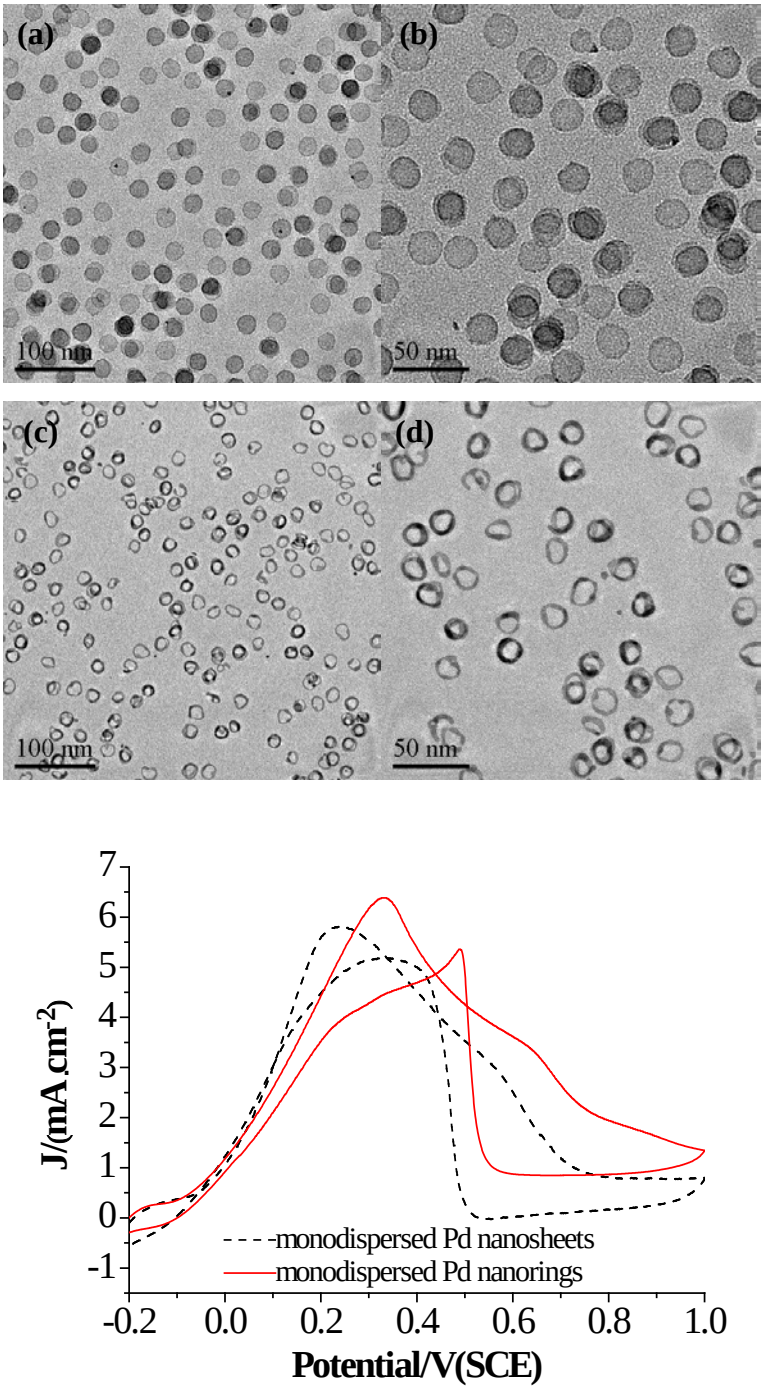


**Fig. S15** TEM images of monodispersed Pd nanosheets (a and b) and monodispersed Pd nanorings (c and d); (e) CV curves for the electrocatalytic oxidation of formic acid by the monodispersed Pd nanosheets, monodispersed Pd nanorings and Pd black. The formic acid oxidation was recorded in 0.5 M $H_2SO_4$ solution at a scan rate of 50 $mV \cdot s^{-1}$ between -0.2 and 1.0 V. The current densities were measured to be 6.41 $mA \cdot cm^{-2}$ at 0.332 V on the monodispersed Pd nanorings and 5.82 $mA \cdot cm^{-2}$ at 0.237 V on the monodispersed Pd, nansheets, respectively.