## Supporting Information

## Palladium Nanoparticles Passivated by Metal-Carbon Covalent Linkages

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TEM Measurements of Pd-SR nanoparticles (Figure S1)



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**Figure S2**. Current-potential profiles of a dropcast thick film of (A) Pd-SC6, (B) Pd-SC10; and (C) Pd-SC12 nanoparticles at varied temperature. Potential scan rate 20 mV/s. Note that (in panel C the curves were all smoothed because of low signal/noise ratio, and the significance of the wavy features is unknown.



**Figure S3**. Temperature dependence of the Pd-SR particle ensemble conductivity. Inset shows the semilog plot of the particle conductivity at 320 K as a function of the chainlength of the organic capping ligands. Experimental data are obtained from Figure S2.



**Figure S4** I-V curves of a solid film of p-toluenethiolate-protected Pd nanoparticles at different temperatures. The film was prepared by dropcasting 4 mL of the particle solution (50mg/mL in toluene) onto a Au IDA electrode. Sweep rate 20 mV/s. Inset shows the Arrhenius plot of the film conductivity with temperature.