## **Supporting Information**

## Atomically Dispersed Platinum on Gold Nano-Octahedra with High Catalytic Activity on Formic Acid Oxidation

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**Figure S1.** Cyclic voltammograms of gold nano-octahedra in (a)  $0.1 \text{ M H}_2\text{SO}_4$  solution and (b)  $0.1 \text{ M H}_2\text{SO}_4 + 10 \text{ mM CuSO}_4$  solution with a scan rate of 50 mV/s.



**Figure S2.** Chronoamperometry for platinum deposition on gold nano-octahedra performed in 10  $\mu$ M H<sub>2</sub>PtCl<sub>6</sub> + 0.1 M H<sub>2</sub>SO<sub>4</sub> solution. OCV (open circuit voltage) was applied for 3 sec and then 0.48 V was applied (arrow pointed).



Figure S3. Linear scan voltammetry of CO stripping (red line) and subsequent cyclic voltammogram (black line) of platinum electrode in  $0.1 \text{ M H}_2\text{SO}_4$  solution with a scan rate of 50 mV/s.



**Figure S4.** Linear scan voltammetry of CO stripping (red line) and subsequent cyclic voltammogram (black line) in  $0.1 \text{ M H}_2\text{SO}_4$  solution with a scan rate of 50 mV/s for the bare gold surface



**Figure S5.** X-ray photoelectron spectroscopy results showing Pt 4f region for 0.05 ML, 1 ML and 5 ML samples.



**Figure S6.** Chronoamperometry showing the long-term stability for electrocatalytic formic acid oxidation performed in  $0.5 \text{ M HCOOH} + 0.1 \text{ M H}_2\text{SO}_4$  solution at 0.32V.



**Figure S7.** (a) TEM image of Pt monolayer prepared by UPD method. (b) Forward scan segments of the cyclic voltammograms for electrocatalytic formic acid oxidation.



**Figure S8.** (a) TEM image of Pt bulk deposited on the corners of gold nano-octahedra by chemical reduction. (b) Forward scan segments of the cyclic voltammograms for electrocatalytic formic acid oxidation. [adapted from reference 21; Min, M.; Kim, C.; Lee, H. *J. Mol. Catal. A: Chem.* 2010, 333, 6-10]