Supporting Information

Optimizing plasmonic metal structure for improving the hydrogen production efficiency of metal-organic frameworks

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Figure S1. TEM images of Au nanoparticles prepared by reducing the length of Au NRs with 10 mM HAuCl₄ (3.7 mL). Scale bars: 200 nm.
**Figure S2.** TEM images of (a) seeds A, (b) seeds B and (c) Au NS$_{18}$ (inset c is size distribution of Au NS$_{18}$). Scale bars: 100 nm.
Figure S3. FT-IR spectra of Au NR$_{67}$ and Au NS$_{18}$.
Figure S4. (a) TEM images of Pt NPs and (b) size distribution of Pt NPs. Scale bars: 100 nm.
Figure S5. SEM images of as-prepared samples. (a) Pt@MIL-125, (b) Pt@MIL-125/Au NR$_{67}$, (c) Pt@MIL-125/Au NR$_{52}$, (d) Pt@MIL-125/Au NR$_{38}$ and (e) Pt@MIL-125/Au NS$_{18}$. Scale bars: 500 nm. Insets are the corresponding single particle of each sample.
Figure S6. Powder XRD patterns of Pt@MIL-125, Pt@MIL-125/Au NR$_{67}$, Pt@MIL-125/Au NR$_{52}$, Pt@MIL-125/Au NR$_{38}$, and Pt@MIL-125/Au NS$_{18}$. 
Figure S7. The XPS spectra for (a) wide scan, (b) C 1s, (c) Ti 2p and (d) Pt 4f of Pt@MIL-125, no Au element can be detected.
Figure S8. ESR spectra of Pt@MIL-125 and MIL-125 observed under visible light irradiation (> 420 nm) for 600 s.
Figure S9. The relationship between the length of rod and $\text{H}_2$ generation performance of Pt@MIL-125/Au samples.

$y = -2.14x + 311.54$

$R^2 = 0.937$
Figure S10. Powder XRD patterns of Pt@MIL-125/Au NS$_{18}$ before and after 4 cycles.