

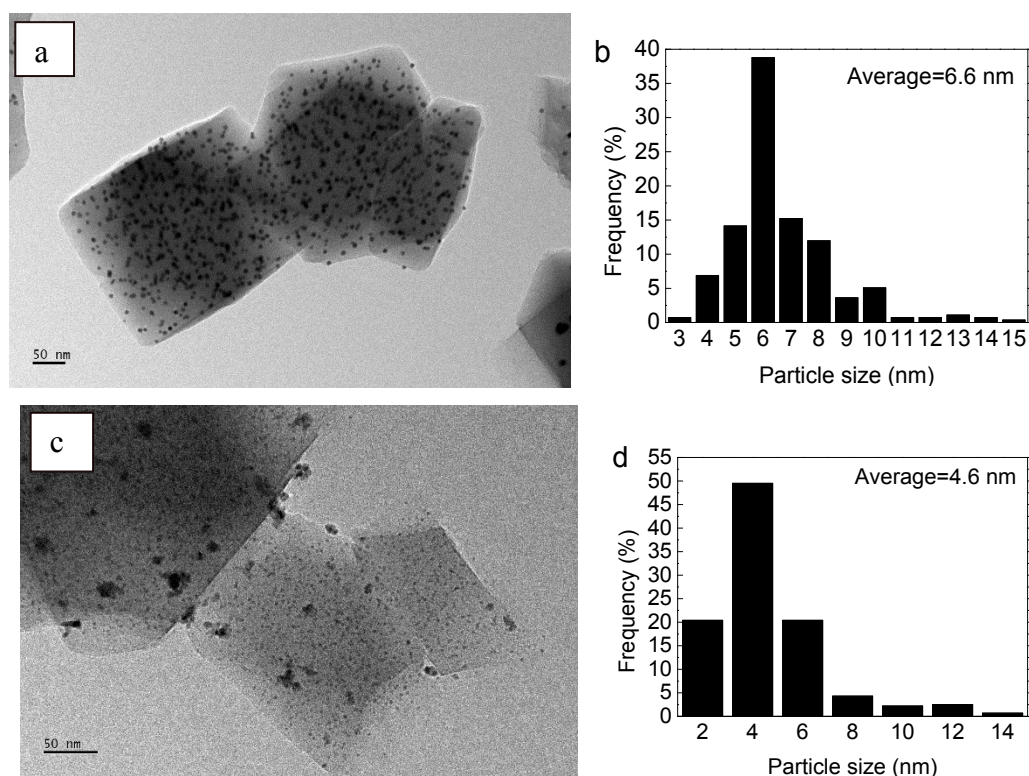
## Supporting Information

### Bimetallic Au–Pd Alloy Nanoparticles Supported on MIL-101(Cr) as Highly Efficient Catalysts for Selective Hydrogenation of 1,3-Butadiene

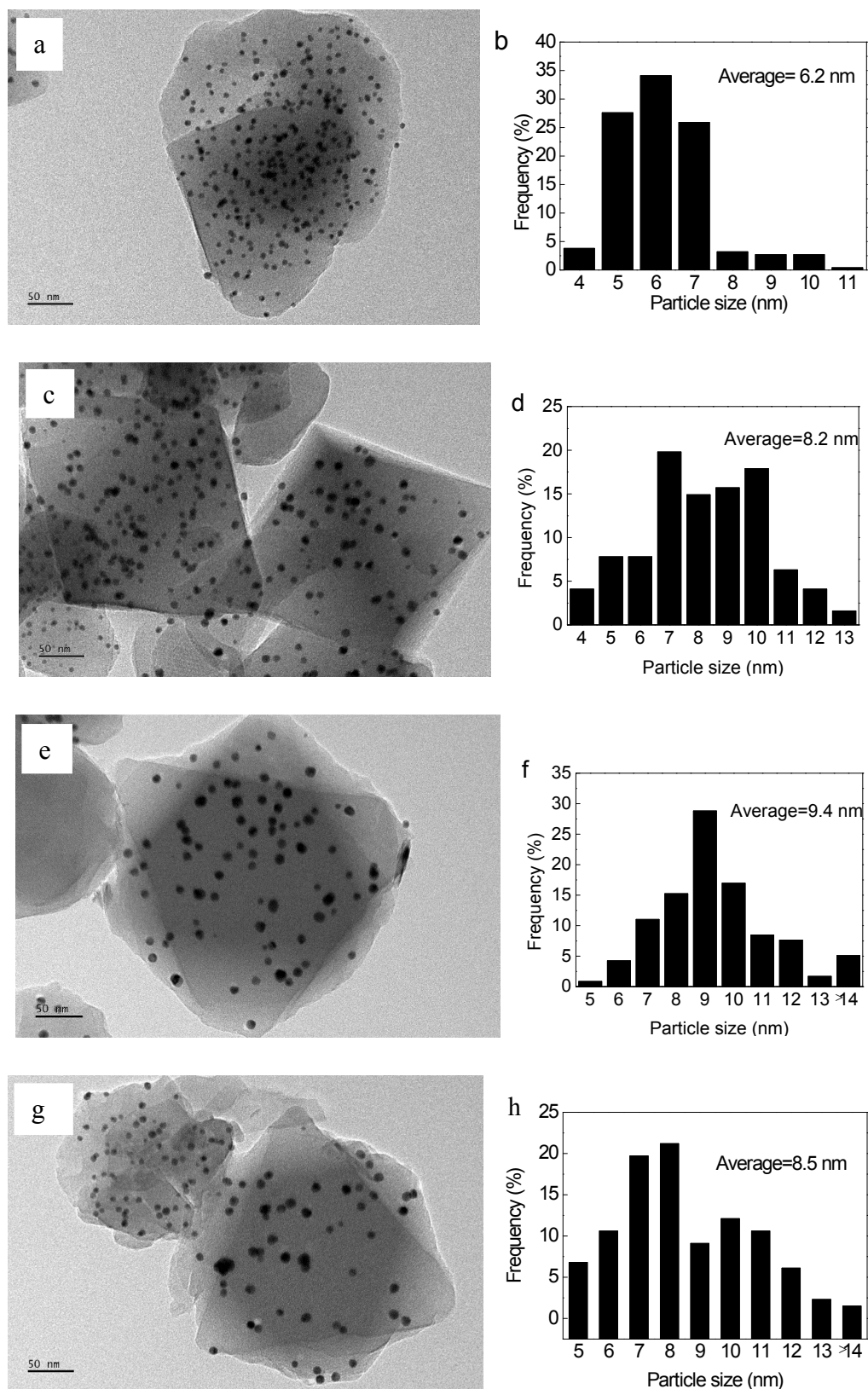
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**Table S1** Au and Pd loadings of as-synthesized catalysts from ICP-AES analysis.

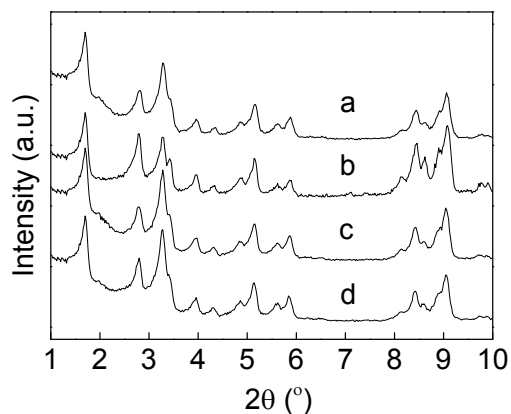
Entry	Catalyst	$w_{\text{Au}}$ (%)	$w_{\text{Pd}}$ (%)	Mole ratio (Au:Pd)
1	Au(3)Pd(1)/MIL-101(Cr)	2.30	0.40	3:1
2	Au(2)Pd(1)/MIL-101(Cr)	2.03	0.58	2:1
3	Au(1)Pd(2)/MIL-101(Cr)	1.25	1.35	1:2
4	Au(1)Pd(3)/MIL-101(Cr)	1.00	1.60	1:3
5	Au/MIL-101(Cr)	2.55	–	–
6	Pd/MIL-101(Cr)	–	2.66	–



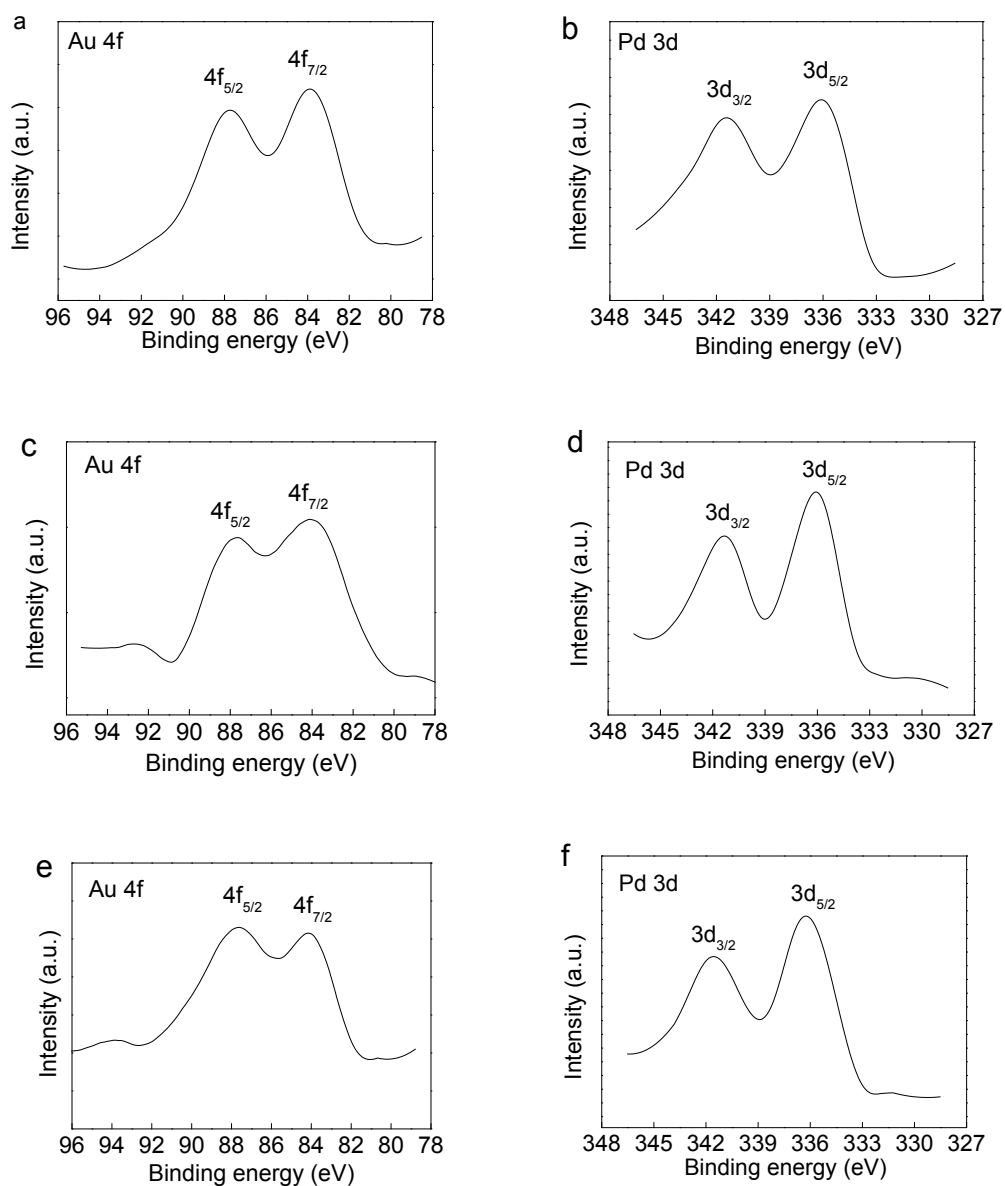
**Fig. S1** TEM micrographs and particle size distribution histograms of Au/MIL-101(Cr) (a, b) and Pd/MIL-101(Cr) (c, d).

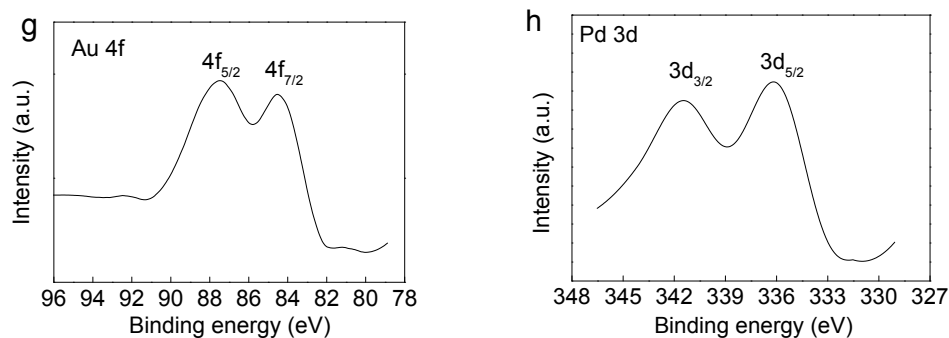


**Fig. S2** TEM micrographs and the particle size distribution histograms of Au(2)Pd(1)/MIL-101(Cr): (a, b) pretreatment in flowing N<sub>2</sub> at 50 °C for 1 h; (c, d) pretreatment in flowing N<sub>2</sub> at 80 °C for 1 h; (e, f) pretreatment in flowing N<sub>2</sub> at 100 °C for 1 h; (g, h) pretreatment in flowing H<sub>2</sub> at 50 °C for 1 h.

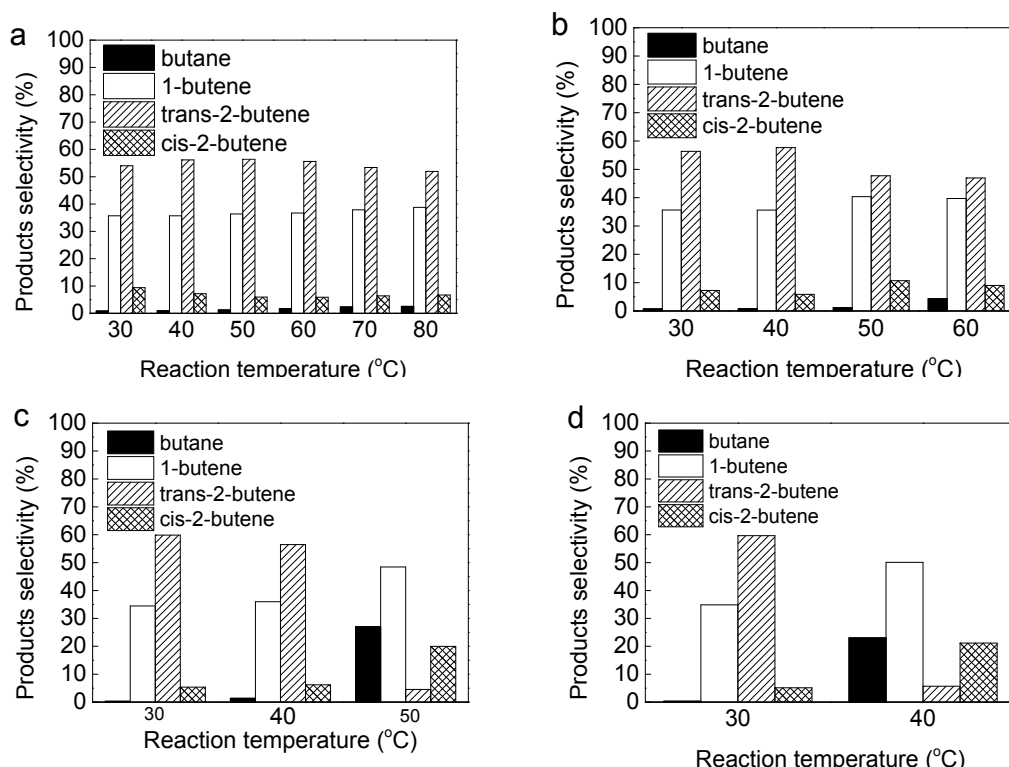


**Fig. S3** XRD patterns of Au(2)Pd(1)/MIL-101(Cr): (a) pretreatment in flowing  $N_2$  at 50 °C for 1 h; (b) pretreatment in flowing  $N_2$  at 80 °C for 1 h; (c) pretreatment in flowing  $N_2$  at 100 °C for 1 h; (d) pretreatment in flowing  $H_2$  at 50 °C for 1 h.

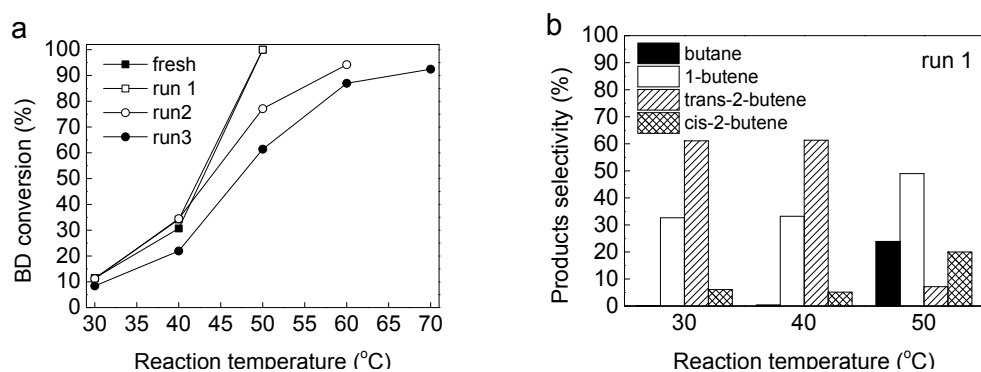


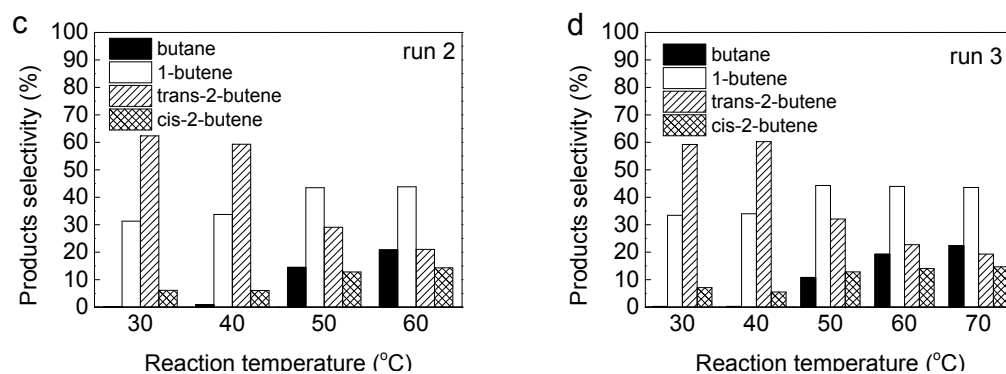


**Fig. S4** Au 4f and Pd 3d XPS of Au(2)Pd(1)/MIL-101(Cr): (a,b) pretreatment in flowing  $N_2$  at 50 °C for 1 h; (c, d) pretreatment in flowing  $N_2$  at 80 °C for 1 h; (e, f) pretreatment in flowing  $N_2$  at 100 °C for 1 h; (g, h) pretreatment in flowing  $H_2$  at 50 °C for 1 h.

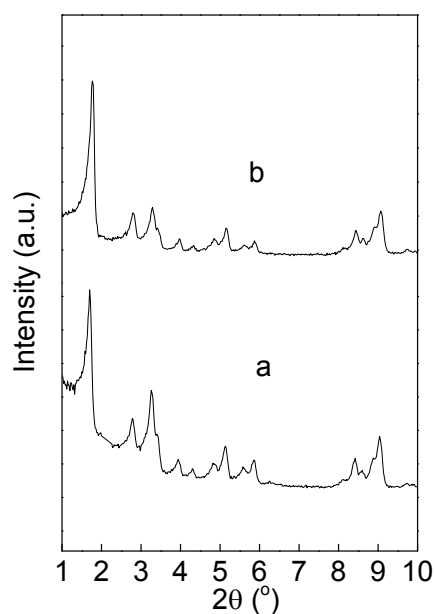


**Fig. S5** The product selectivities over Au-Pd bimetallic catalysts with different Au:Pd mole ratio: (a) Au(3)Pd(1)/MIL-101(Cr); (b) Au(2)Pd(1)/MIL-101(Cr); (c) Au(1)Pd(2)/MIL-101(Cr); (d) Au(1)Pd(3)/MIL-101(Cr) (the catalysts were pretreated in flowing  $N_2$  at 50 °C for 1 h before reaction). (supporting information, page 4)

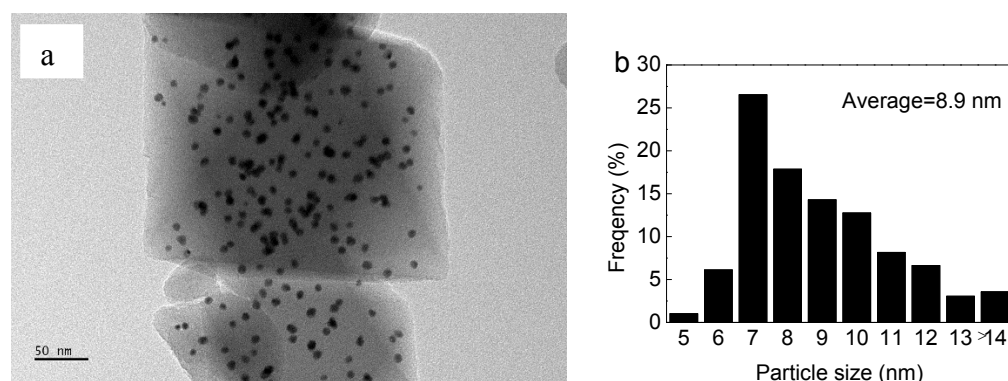




**Fig. S6** The reusability of Pd/MIL-101(Cr): (a) BD conversion; (b–d) Product selectivity.



**Fig. S7** XRD patterns of as-prepared (a) and reused Au(2)Pd(1)/MIL-101(Cr) (b).



**Fig. S8** TEM micrograph (a) and the Au–Pd particle size distribution histograms (b) of reused Au(2)Pd(1)/MIL-101(Cr).