

Novel AuPd Nanostructures for Hydrogenation of 1, 3-Butadiene

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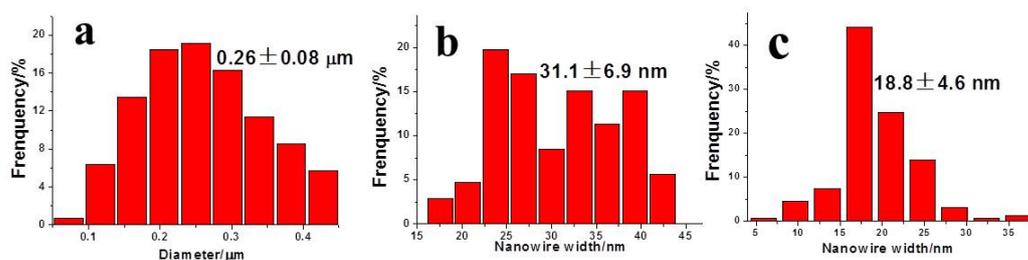


Figure S1. The corresponding histograms of diameter distribution of (a) blossoms by mode A and long pedicels by (b) mode A, (c) mode B.

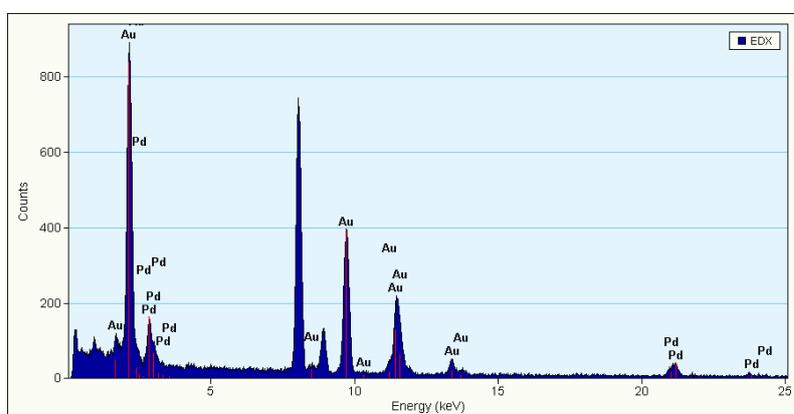


Figure S2. EDX pattern of AuPd NFs.

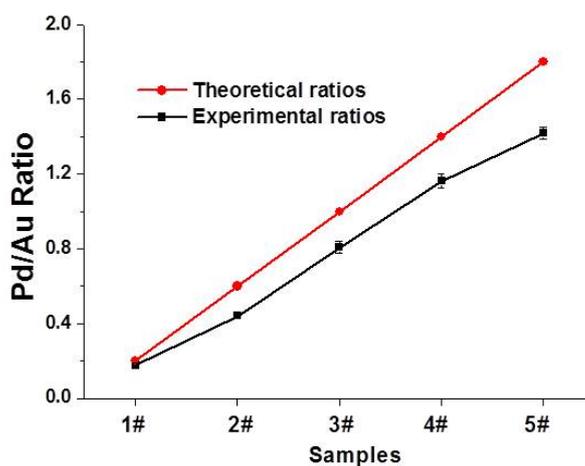


Figure S3. Comparison with theoretical and experimental ratios of Pd/Au on the AuPd-NF/microorganism materials, samples 1#-5# refer to initial Pd/Au ratios of 1:5, 3:5, 5:5, 7:5 and 9:5

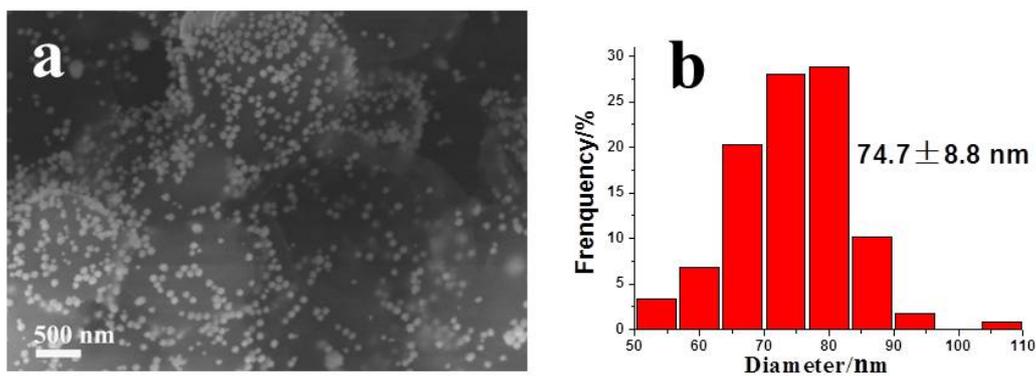


Figure S4. (a) SEM image of AuPd NPs by Mode C and (b) the corresponding histograms of diameter distribution of NPs.

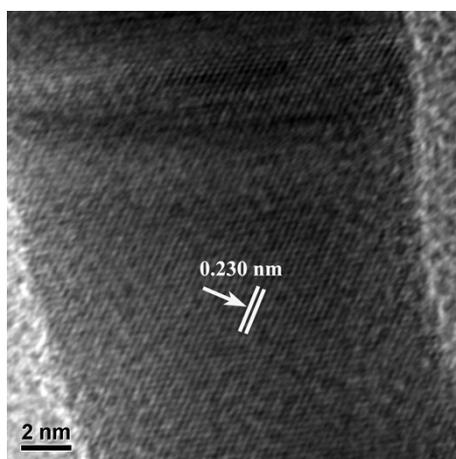


Figure S5. HRTEM image of pedicel by Mode A.

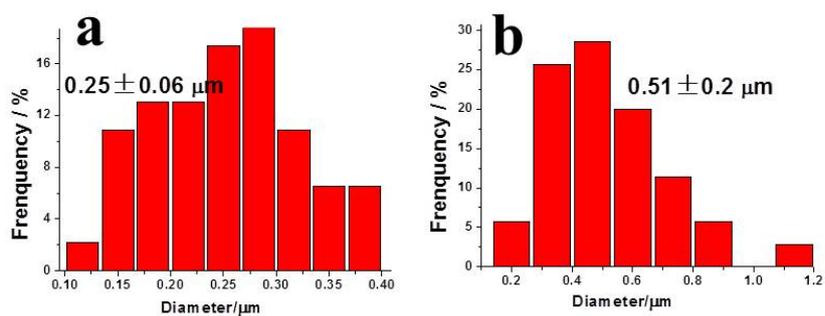


Figure S6. The corresponding histograms of diameter distribution of open blossoms at the CTAC concentration of (a) 10.0 mM and (b) 15.0 mM.

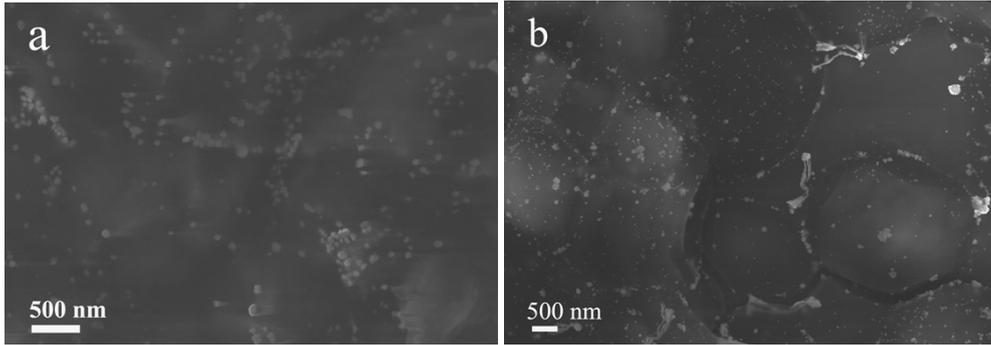


Figure S7. SEM images of AuPd bimetallic nanostructures synthesized through Mode A at initial HAuCl_4 (0.25 mM), H_2PdCl_4 (0.25 mM), PPCs (0.005 g) and AA (1.0 mM) in the presence of 5.0 mM (a) OTAC and (b) DTAC.

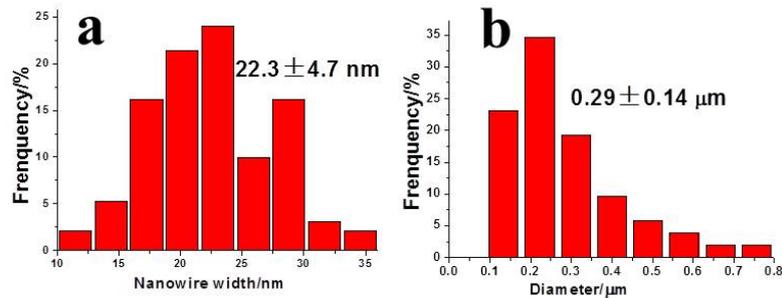


Figure S8. The corresponding histograms of diameter distribution of (a) long pedicels at 0.5 mM AA concentration and (b) blossoms at 5.0 mM AA concentration.

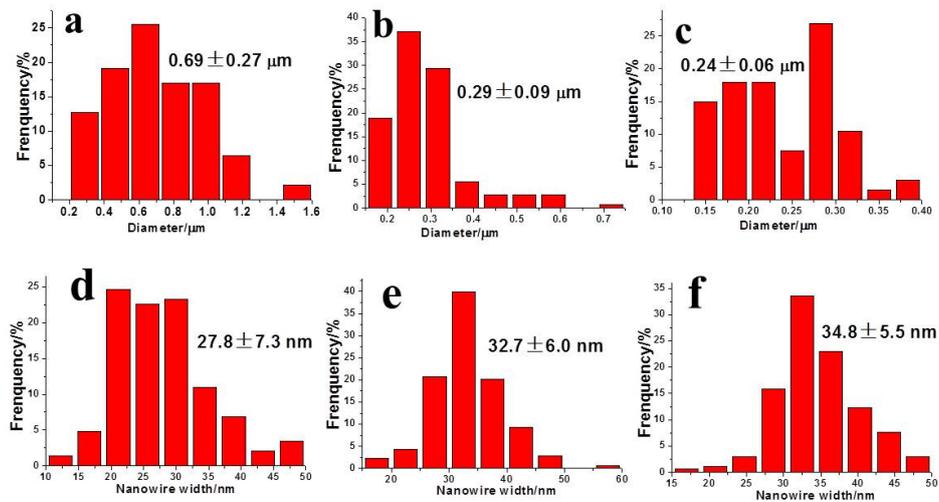


Figure S9. The corresponding histograms of diameter distribution: blossoms at Pd:Au ratios of X:5 where X is (a) 1, (b) 3, (c) 7; long pedicels at Pd:Au ratios of X:5 where X is (a) 3, (b) 7, (c) 9.

Table S1. XPS peak positions and atomic ratios of AuPd alloy nanostructures

PdCl ₂ /HAuCl ₄ (mol/mol)	Binding Energy / eV				Results	
	Pd		Au		Pd/Au (at. % /at. %)	Ratios
	3d _{5/2}	3d _{3/2}	4f _{7/2}	4f _{5/2}		
1:5	335.1	340.4	84.0	87.7	4.44/6.46	0.69
3:5	335.2	340.5	83.8	87.5	4.69/4.32	1.09
5:5	335.7	341.0	83.7	87.4	1.95/0.27	7.22
7:5	335.8	341.1	83.6	87.3	1.82/0.15	12.13
9:5	335.9	341.2	83.4	87.1	2.27/0.16	14.19

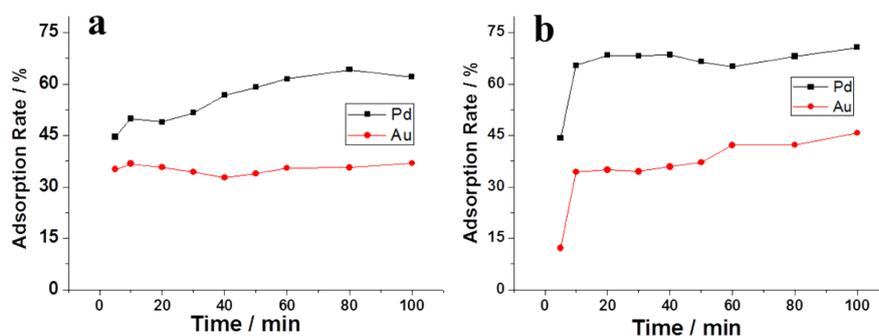


Figure S10. Adsorption rates of Au and Pd (1:1) adsorbed by the PPCs as a function of time (min) at the same conditions with **Figure 1** without adding AA: (a) adding Au and Pd ions separately and (b) adding Au and Pd ions together.

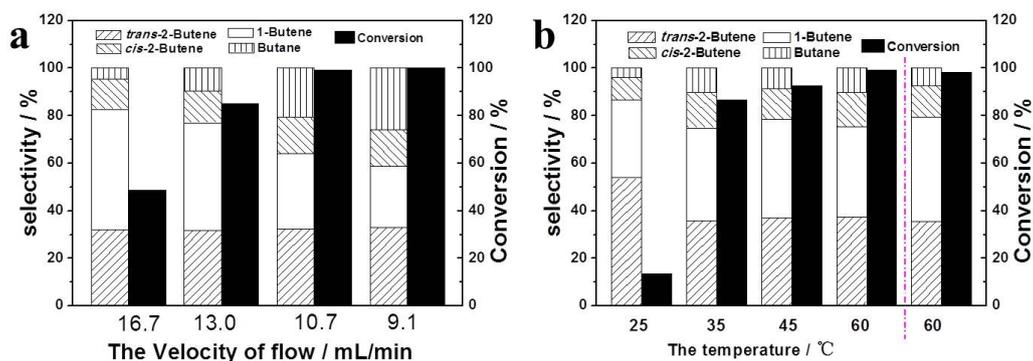


Figure S11. Product conversion and selectivity in 1, 3-butadiene hydrogenation over AuPd (5:5) /PPCs catalysts in (a) different velocity of gas flow and (b) different temperatures in 13.0 mL/min velocity of flow on the left of pink dash dot line and 16.7 mL/min velocity of gas flow on the right.