catalysts

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Article

Supplementary Materials: Improvement Effect of Ni to Pd-Ni/SBA-15 Catalyst for Selective Hydrogenation of Cinnamaldehyde to Hydrocinnamaldehyde

Shiying Han, Yunfei Liu, Jiang Li, Rui Li, Fulong Yuan * and Yujun Zhu *

Table S1. Selective hydrogenation of cinnamaldehyde to hydrocinnamaldehyde over heterogeneous catalysts from the literatures.

Catalysts	Reaction Conditions	CAL Conversion (%)	HALD Selectivity (%)	References
Pd/CNS	60 °C，2 h, P(H_2)=10 bar	59.1	65.3	7
Pd-WN/SBA-15	40 °C，2 h, P(H_2)=10 bar	99.5	97.6	9
Pd/$La_2O_2CO_3$	80 °C, 3 h, P(H_2)=1 bar	100	86	23
Pd-NMC	30 °C, 3 h, P(H_2)=5 bar	100	93	24
Ni/TiO_2	120 °C, 1 h, P(H_2)= 20 bar	70–99	25.3–64.6	27
$PdAu_{0.2}$/MSN	50 °C, 1 h, P(H_2)=5 bar	100	92	30
Cu-Pt/SiO_2	80 °C, 2 h, P(H_2)=40 bar	10.7	60	31
Pt_m^Au / SiO_2	150 °C, 4 h, P(H_2)=10 bar	65	79	32
Ni–Ir/TiO_2	80 °C, 20 min, P(H_2)=20 bar	97.8	95.4	5

Table S2. Details in the hydrogenation of CAL to HALD using Pd based catalysts.

Catalysts	Reaction Conditions	CAL Conversion (%)	HALD Selectivity (%)	References
0.2%Pd-1.2%Ni/SBA-15	80 °C, 2 h, P(H_2)=12 bar	96.3	87.8	this work
5.0 wt%Pd/MWCNT	60 °C, 1 h, P(H_2)=40 bar P(CO_2)=148 bar	98.6	91.3	59
3.0 wt%Pd/(SH)MSC	80 °C, 2 h, P(H_2)= 10 bar	100	80	3
0.7 wt%Pd/γ-Al_2O_3	100 °C, 3 h, P(H_2)= 20 bar	100	97	60
0.98 wt%Pd/$La_2O_2CO_3$-NRs	80 °C, 2 h, P(H_2)= 1 bar	100	86	23
2.5 wt%Pd/STNT	30 °C, 150 min, P(H_2)= 5 bar	80	84	61
1.5% Pd–MWCNT/AC	70 °C, 30 min, P(H_2)= 5 bar	41.8	95.9	62
1.0 wt%Pd/ZIF-8	40 °C, 6 h, P(H_2)= 20 bar	>99.9	90.4	63

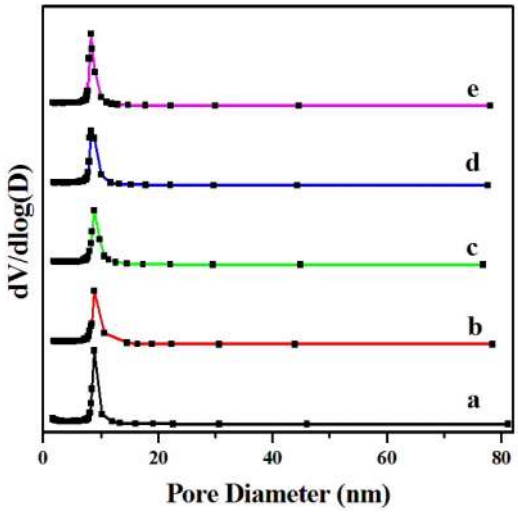

Figure S1. The pore size distributions calculated from the desorption using the BJH method for **(a)** SBA-15, (**b**) 0.2%Pd/SBA-15, (**c**) 0.2%Pd-0.4%Ni/SBA-15, (**d**) 0.2%Pd-0.7%Ni/SBA-15, (**e**) 0.2%Pd-1.2%Ni/SBA-15.

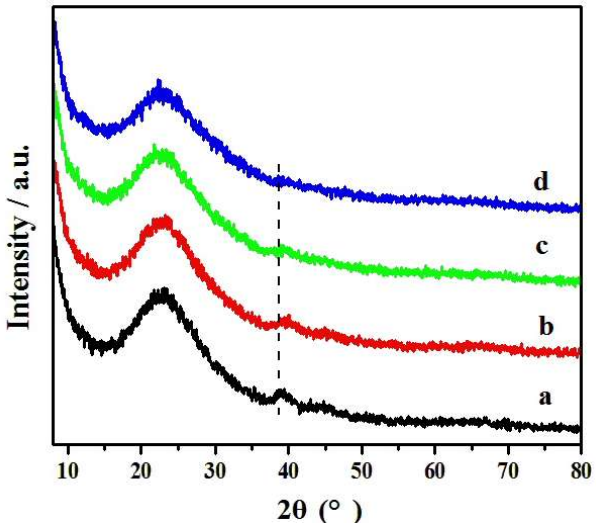

Figure S2. Wide-angle XRD patterns of (**a**) 0.9%Pd/SBA-15, (**b**) 0.9%Pd-0.4%Ni/SBA-15, (**c**) 0.9%Pd-0.7%Ni/SBA-15, (**d**) 0.9%Pd-1.2%Ni/SBA-15.

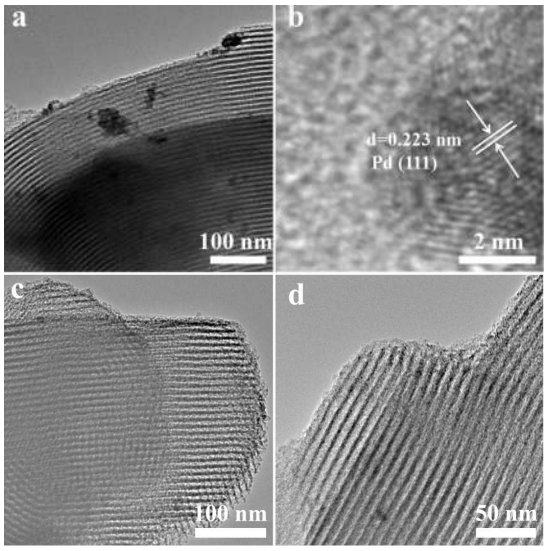

Figure S3. TEM images of (**a**–**b**) 0.9%Pd/SBA-15, (**c**–**d**) 0.9%Pd-1.2%Ni/SBA-15.

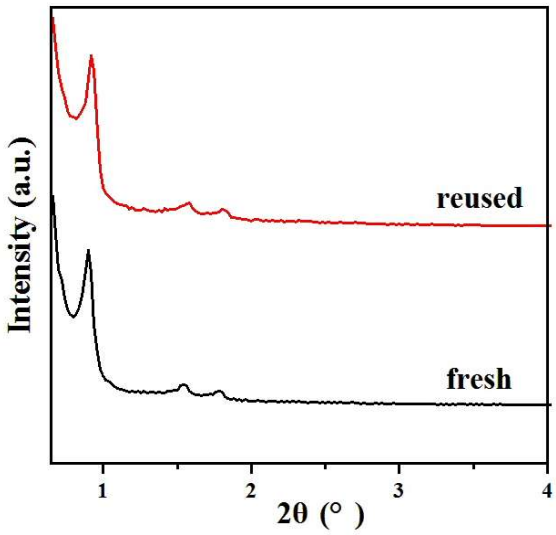

Figure S4. Low-angle XRD patterns for fresh and reused 0.2%Pd-1.2%Ni/SBA-15 catalyst.

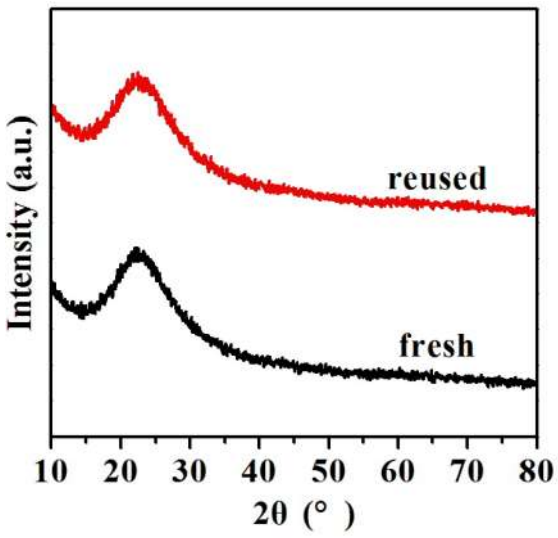

Figure S5. Wide-angle XRD patterns for fresh and reused 0.2%Pd-1.2%Ni/SBA-15 catalyst.

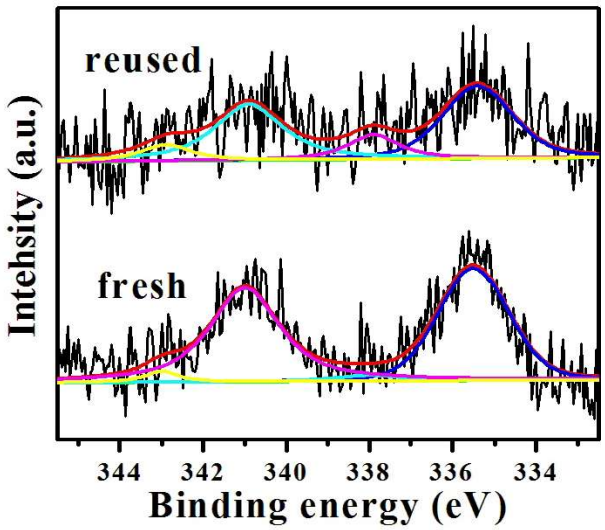

Figure S6. Pd 3d XPS spectra for fresh and reused 0.2%Pd-1.2%Ni/SBA-15 catalyst.