

Electronic Supplemental Information to
**Doping Pd/SiO₂ with Na⁺: changing the reductive
etherification of C=O to furan ring hydrogenation of
furfural in ethanol**

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Table S1. Pd loading, particle size and textural properties of Pd/SiO₂ and Pd-Na/SiO₂ catalysts

Catalyst	Pd ^a (wt.%)	SSA ^b (m ² g ⁻¹)	V _{total} ^c (cm ³ g ⁻¹)	D ^d (nm)
Pd-SiO ₂	2.2	227	1.0	8.7
Pd-Na/SiO ₂	2.0	155	1.3	4.6

- a. Determined by ICP.
- b. Calculated by N₂ adsorption with BET method.
- c. Determined from the adsorption amount of nitrogen at P/P₀ = 0.99.
- d. Average size of NPs determined by TEM investigation.

Table S2. Catalytic hydrogenation of furfural in ethanol over Pd/SiO₂ under different temperature and H₂ pressure.^a

Temp. (°C)	H ₂ (MPa)	Conv. (%)	Sel. (%) ^b				
			EFE	FDA	THFDA	FA	THF A
80	0.3	91	35	30	2	19	5
100	0.3	100	58	0	0	7	9
120	0.5	100	50	0	14	10	8
120	1	100	7	0	22	0	26

^a Reaction conditions: 100 mg of catalyst; reaction time 1 h.

^b In some cases, other products (not shown) due to the decomposition of EFE were detected.

Table S3. The activities of furfural acetalization with ethanol over SiO₂, alkaline-treated SiO₂ and Pd/SiO₂ catalysts. Reaction conditions: 10 mL of 0.24 M FAL ethanol solution; 120 °C; 100 mg catalyst; 30 min.

Sample	Conv. (%)
SiO ₂	51
SiO ₂ -Na	0
SiO ₂ -K	0
Pd/SiO ₂	44
Pd-Na/SiO ₂	0
Pd-K/SiO ₂	0

Table S4. Catalytic hydrogenation results of 180 μL of FDA in 10 mL of ethanol over Pd/SiO₂ in presence of 20 μL of furfural or furfuryl alcohol for 10 min under 120 °C and 0.3 MPa H₂ pressure.

Additive	FDA Conv. (%)	Sel. (%)			
		EFE	THEFE	THFDA	THFA
Fufural (FAL)	91	34	11	29	8
Furfuryl alcohol (FA)	12	22	10	60	-

Figure S1. The Na 1s XPS spectra of Pd/SiO₂ and Pd-Na/SiO₂ catalysts.

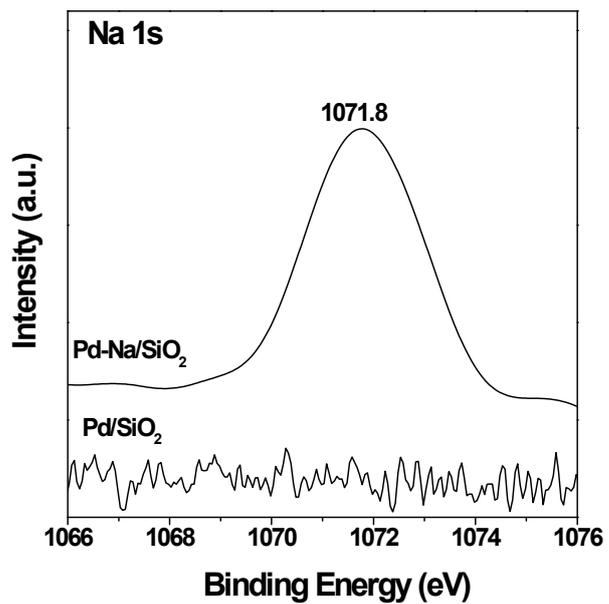


Figure S2. Catalytic hydrogenation of furfural in isopropanol over Pd(-Na)/SiO₂ catalyst. Reaction conditions: 10 mL of 0.24 M FAL ethanol solution; 120 °C; 0.3 MPa H₂; 100 mg catalyst.

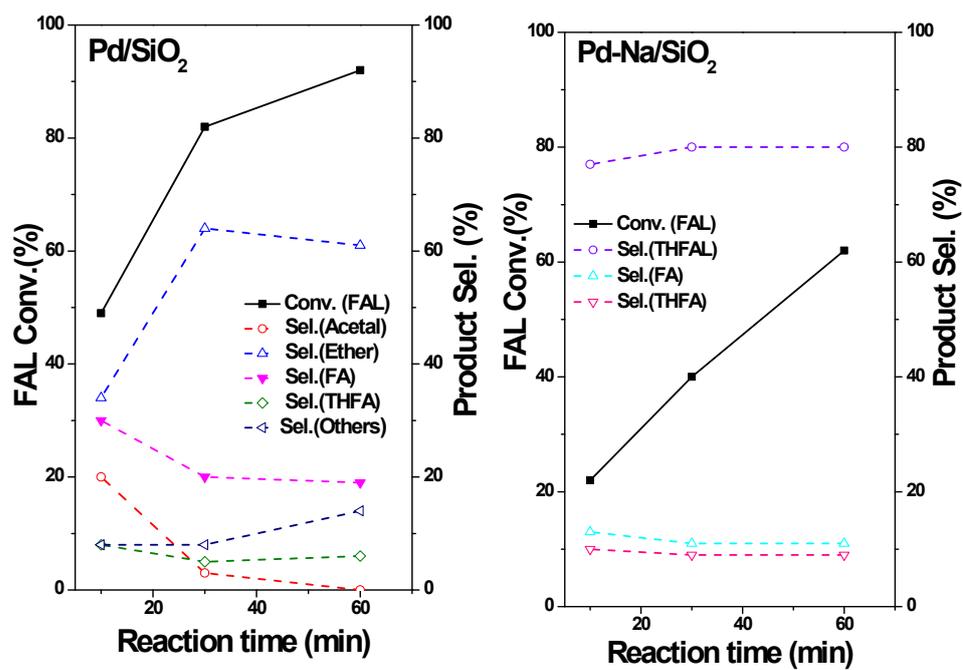


Figure S3. Catalytic hydrogenation of furfural over Pd-K/SiO₂ catalyst. Reaction conditions: 10 mL of 0.24 M FAL ethanol solution; 120 °C; 0.3 MPa H₂; 100 mg catalyst.

