Supporting Information

Mild and selective transfer hydrogenation of biomass-derived furfural to furfuryl alcohol over $Cu/ZnO/Al_2O_3$ with methanediol as hydrogen donor

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Supplementary figures and data

Table S1 Comparison of textural properties of fresh (0h) and reacted (6 h) CZA Catalysts.

Catalyst	S_{BET} (m_2/g)	d_{Cu} (nm)	V_p (cm^3/g)	$D_{average}$ (nm)
CZA-fresh	75.6	6.6	0.216	5.7
CZA-6h-108	71.0	13.7	0.129	7.3
CZA-6h-180	79.5	13.0	0.120	6.0

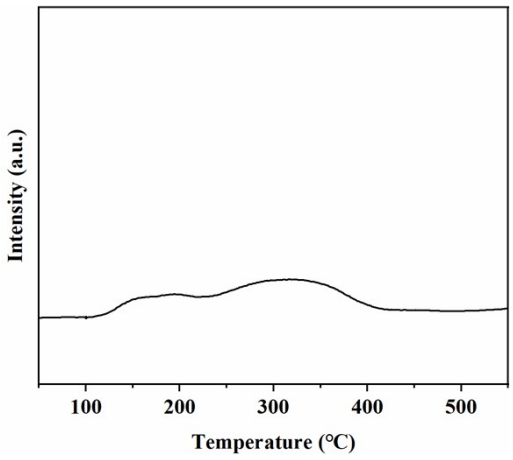


Fig. S1. The CO_2-TPD spectra of the purchased catalysts.

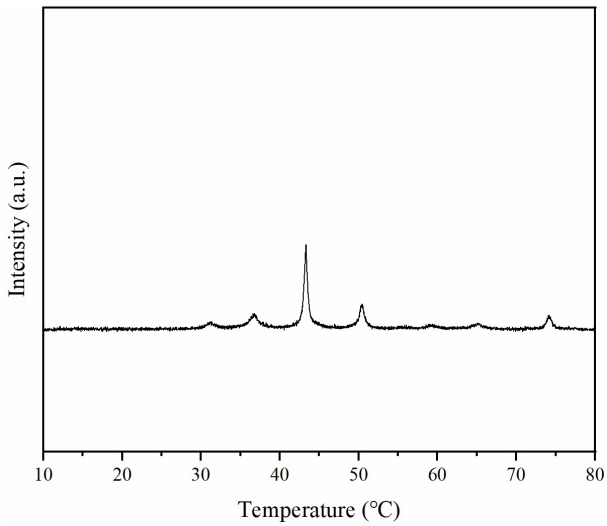


Fig. S2. XRD spectra of the used CZA catalyst at 180°C.

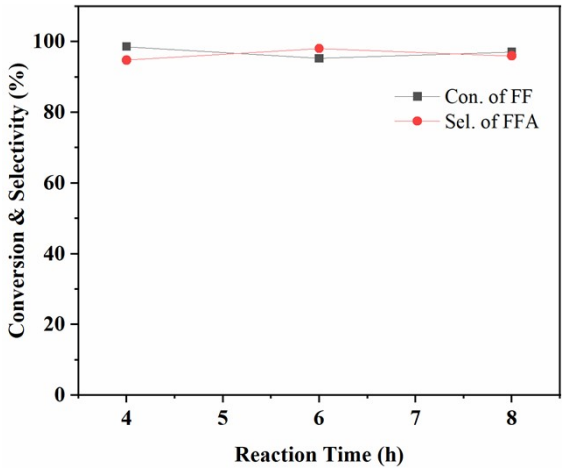


Fig. S3. The stability of CZA catalysts during the CTH of FF to FFA with formaldehyde water as hydrogen donor. Reaction conditions: FF (5 wt%), formaldehyde (5 wt%), water (15 wt%), solvent (1,3-dioxolane), catalyst (15 mL), T =108°C, P=0.1 MPa, τ=1.2 h^{-1}, N_2 atmosphere.

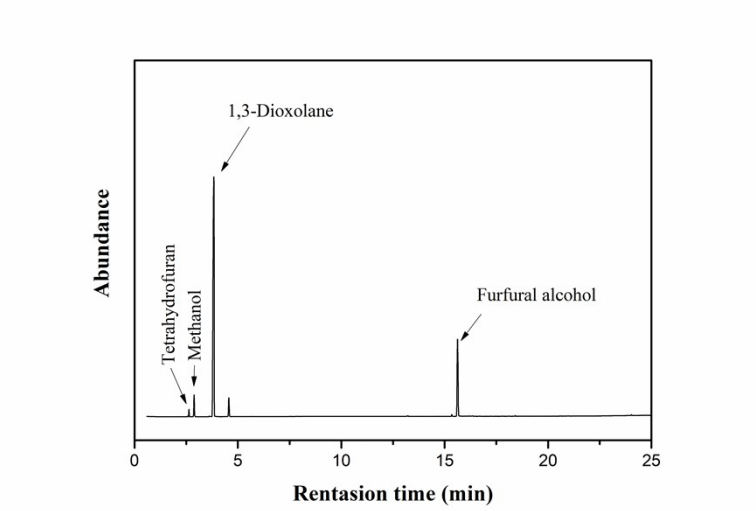
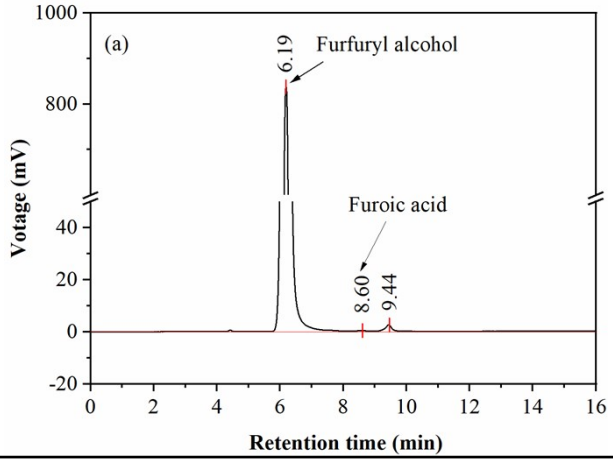
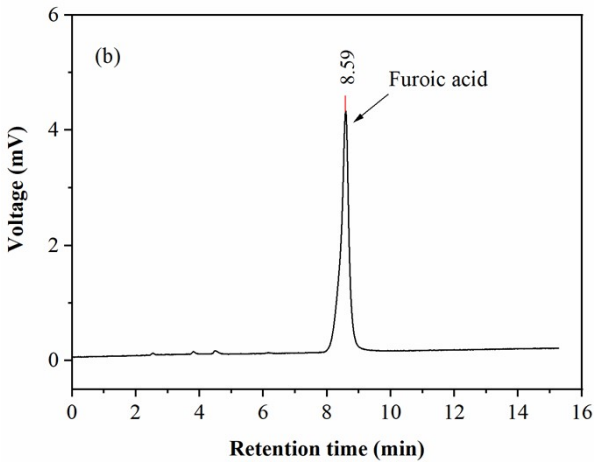


Fig. S4. GC-MS spectrum of the liquid phase product of CZA-catalyzed transfer hydrogenation of furfural with methanediol as hydrogen donor (108 °C).



Peak	Retention time (min)	Area	Area %
1	6.19	10141248	99.62
2	8.60	3575	0.035
3	9.44	34848	0.342



Peak	Retention time (min)	Area	Area %
1	8.59	76258	100

Fig. S5. High-performance liquid chromatography (HPLC) of (a) CTH product at 108°C and (b) ~0.1 wt‰ furoic acid standard substance.