

Supporting Information

Selective Hydrodeoxygenation of 5-hydroxy-2(5H)-furanone to γ -butyrolactone over Pt/mesoporous solid acid bifunctional catalyst

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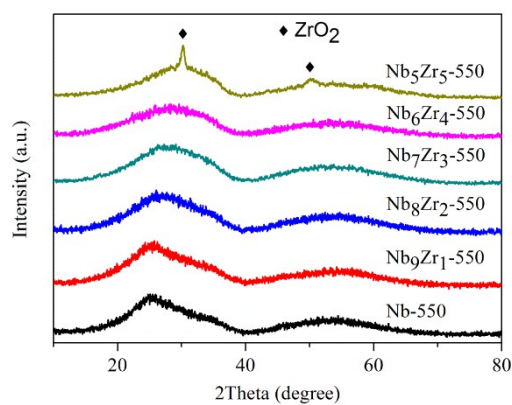


Fig. S1 Wide-angle XRD patterns of Nb_{10-x}Zr_x-550 samples with different ratio of niobium to zirconium.

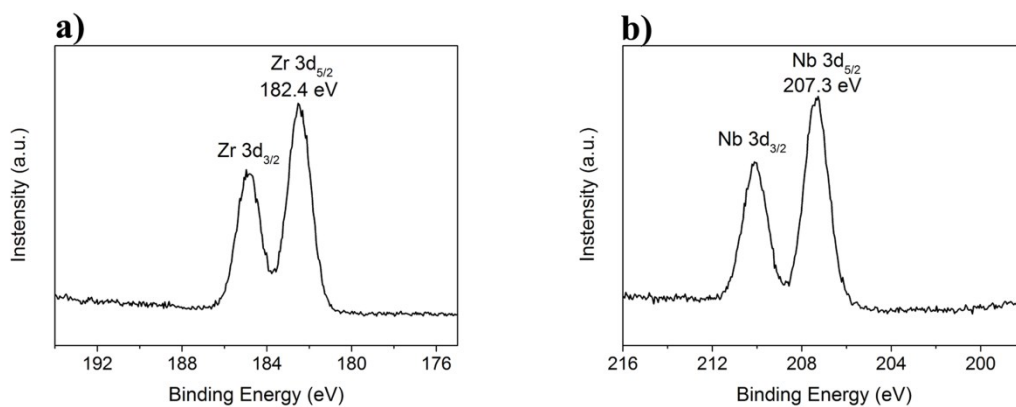


Fig. S2 High resolution of XPS spectra of Zr 3d (a) and Nb 3d (b).

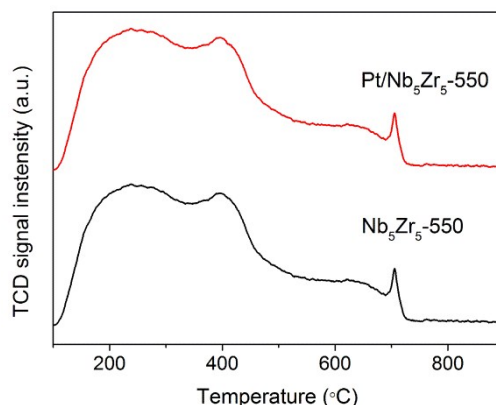

















Fig. S3 NH₃-TPD curves of Nb₅Zr₅-550 and Pt/Nb₅Zr₅-550.

Table S1 Typical catalytic processes for GBL production from furfural derivatives.

Entry	Catalysts and Reaction conditions	Typical Substrates	Target compound (yield %)	References
1	Homogeneous catalyst 0.5 mol% CoCl ₂ , 1 atm O ₂ , 40 °C/ 48 h.		 (34)	P. Li, H. Alper, J. Mol. Catal., 1992, 72, 143-152.
2	Homogeneous catalyst 1 mol% palladium dimer [Pd(PBU _t ² H) (μ-PBU _t ²)] ₂ , 1 atm O ₂ , 50 °C/ 24 h.		 (7.5)	M. Sommovigo, H. Alper, J. Mol. Catal., 1994, 88, 151-158.
3	Homogeneous catalyst 0.7 mol%, [Cu(R ₂ [16]aneN ₆)](ClO ₄) ₂ , 0.05 mol THF, 0.05 mol H ₂ O ₂ , reflux/ 4 h		 (99.9)	M. Salavati-Niasari, Inorg. Chem. Commun., 2006, 9, 628-633.
4	Heterogeneous catalyst [Cu(R ₂ [14]-aneN ₆)] ²⁺ -NaY 0.05 mol THF, 0.05 mol H ₂ O ₂ , reflux/ 4 h		 (17.3))  (80.6)	M. Salavati-Niasari, Inorg. Chem. Commun., 2006, 9, 628-633.
5	Homogeneous catalyst equivalent NaBrO ₃ and KHSO ₄ , 25–30 °C/16 h		 (80.0))	L. Metsger, S. Bittner, Tetrahedron, 2000, 56, 1905-1910.
6	Heterogeneous catalyst 2.8 wt% iron-containing clay 0.05 mol THF, 0.05 mol H ₂ O ₂ , 66 °C/4 h.		 (16.6))	A. Ausavasukhia, T. Sooknoi, Green Chem., 2015, 17, 435-441.
7	Heterogeneous catalyst 10 wt% Pd/SiO ₂ , 2(5H)-furanone (6.0 g), methanol (100 mL), 353 K, 3.5 MPa H ₂ .		 (92.6))	X. D. Li, X. C. Lan, T. F. Wang, Green Chem., 2016, 18, 638-642.

