

Supporting information

Antibiotic Residue Derived Solid Acids for Ethanolysis of Furfuryl Alcohol into Ethyl Levulinate

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Table S1. Essential mesoporous information of as-prepared GR derived solid acids.

Sample	BET surface area	^a P.D.	^b T.P.V.
	m ² /g	nm	cm ³ /g
GR300-S0.25	51.93	4.32	0.16
GR300-0.5-S0.25	49.31	3.83	0.14
GR300-1-S0.25	26.94	3.83	0.098
GR300-2-S0.25	30.04	30.06	0.17

^a P.D., pore diameter, ^b T.P.V., total pore volume.

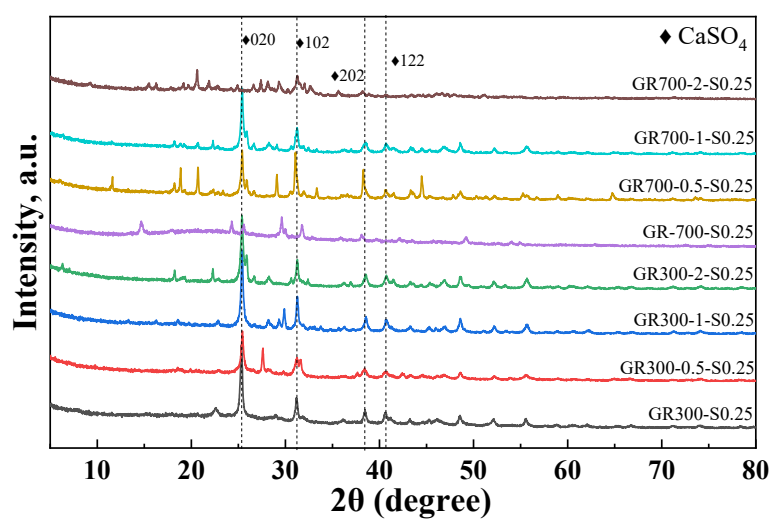


Fig. S1. XRD patterns of as-prepared GR derived solid acids.

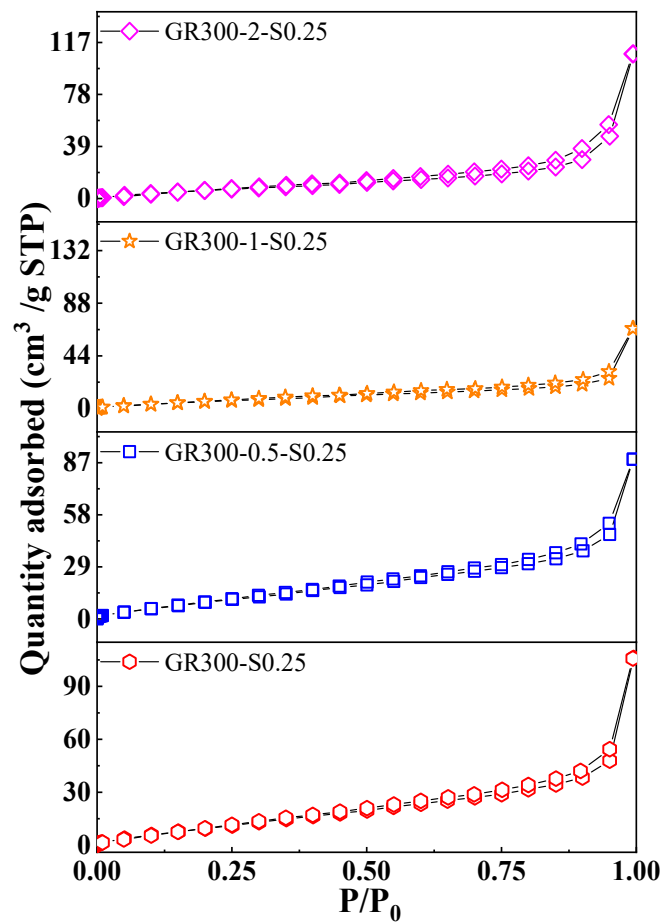


Fig. S2. N_2 adsorption-desorption isotherms of as-prepared GR derived solid acids.

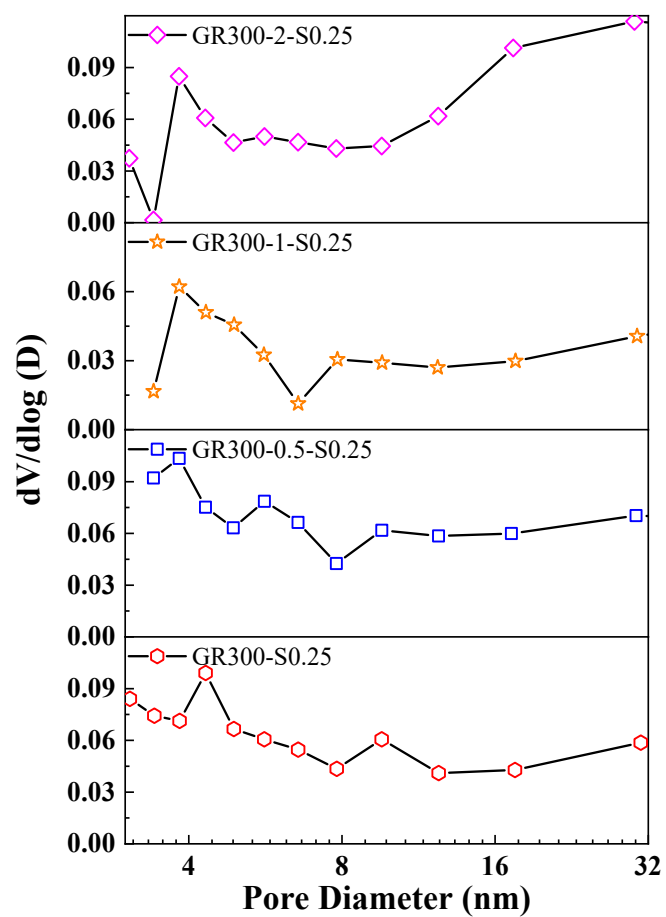


Fig. S3. Pore size distribution of as-prepared GR derived solid acids.

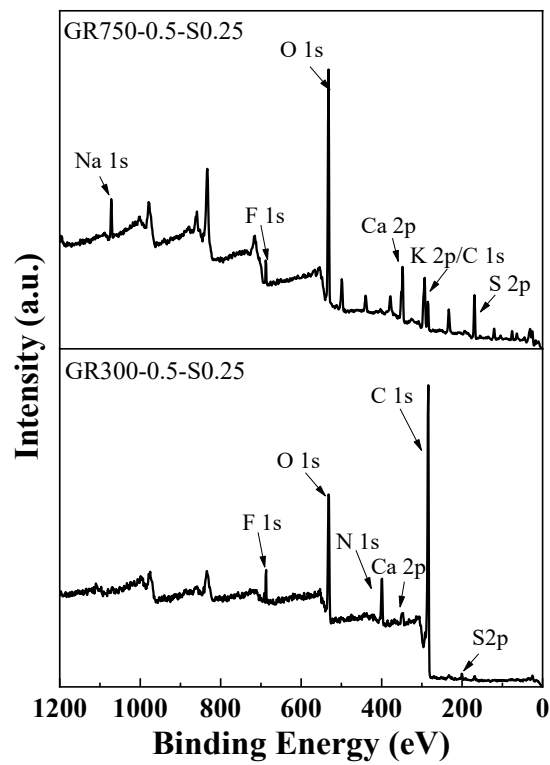
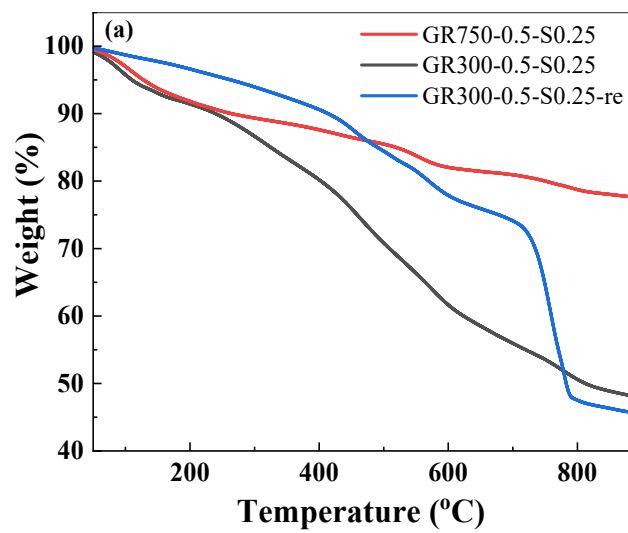


Fig. S4. XPS spectra of GR derived solid acids.



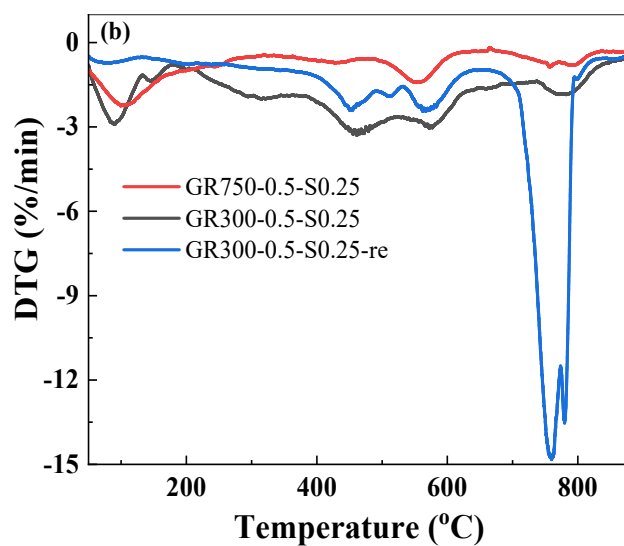


Fig. S5. TG/DTG curves of as-prepared GR derived solid acids: (a) TG; (b) DTG.

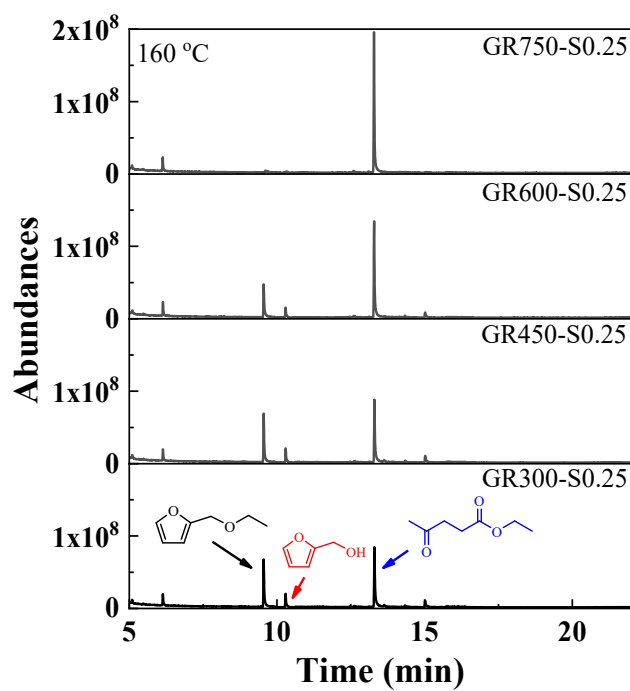


Fig. S6. GC-MS spectra for FA ethanolsis at 160 °C.

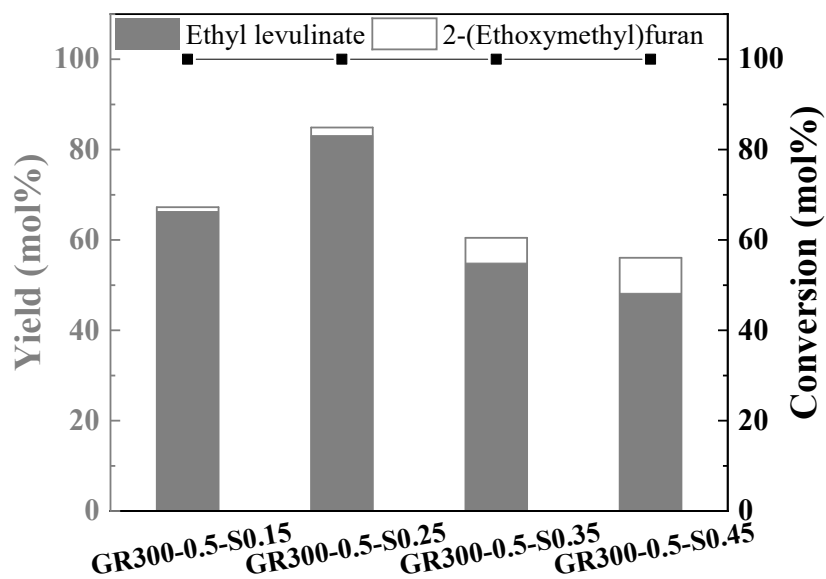


Fig. S7. Effect of chlorosulfonic acid dosage on FA ethanolsis. Reaction conditions:

FA (1 mmol), catalyst (20 mg), ethanol (5 mL), 160 °C, 600 rpm, 1.5 h.

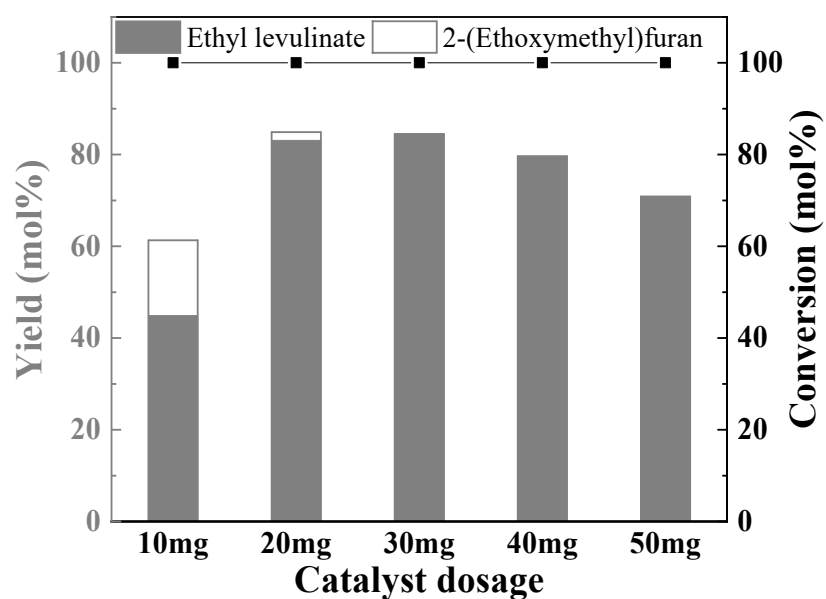


Fig. S8. Effect of catalyst dosage on FA ethanolsis. Reaction conditions: FA (1

mmol), GR300-0.5-S0.25, ethanol (5 mL), 160 °C, 600 rpm, 1.5 h.

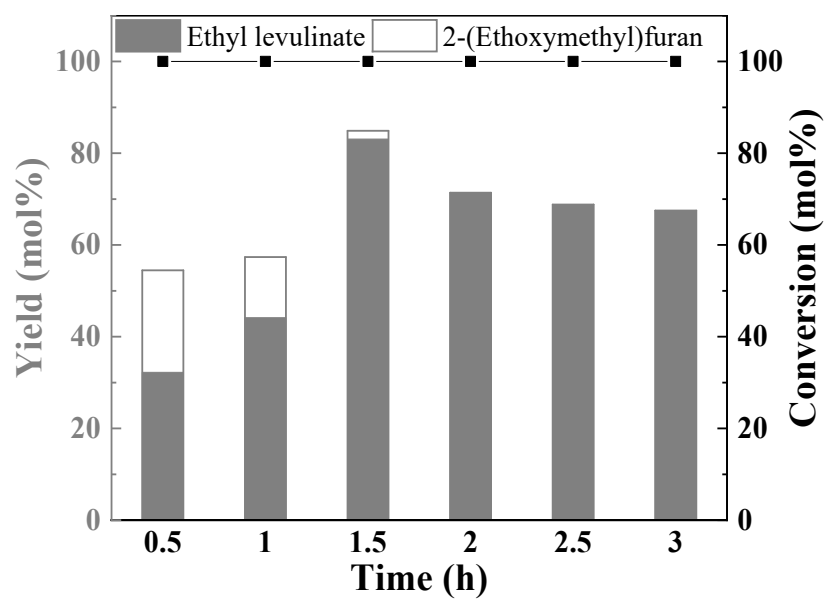


Fig. S9. Effect of reaction time on FA ethanolysis. Reaction conditions: FA (1 mmol), GR300-0.5-S0.25 (20 mg), ethanol (5 mL), 160 °C, 600 rpm.

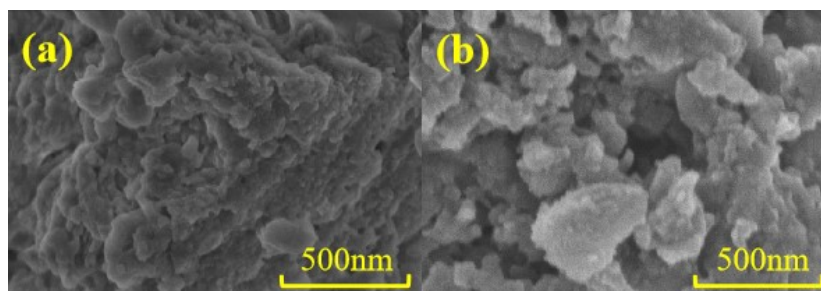


Fig. S10. SEM images for GR300-0.5-S0.25. (a) fresh sample; (b) reactivated sample after four cycles.