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Supporting Information

Synthesis of Glycerol Carbonate using Lithium-modified Zeolite Beta: A Kinetic Study

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Table S1 Comparison with previously reported zeolites.

Sr. No.	Catalyst / amount	Mole ratio (GLY:DMC)	Temperature (°C)	Detection method of product	% Yield	Selectivity of GC (%)	Catalyst reusability	Reaction kinetics
1.	Na-Y/ 10 wt%	1:3	70	GC	80	99	5	-
2.	K-Zeolite/ 4wt%	1:3	75	GC	96	100	4	-
3.	$Li_{20}\beta$/ 10wt%	1:5	95	^{1}H NMR	81.48	100	5	2^{nd} order kinetics

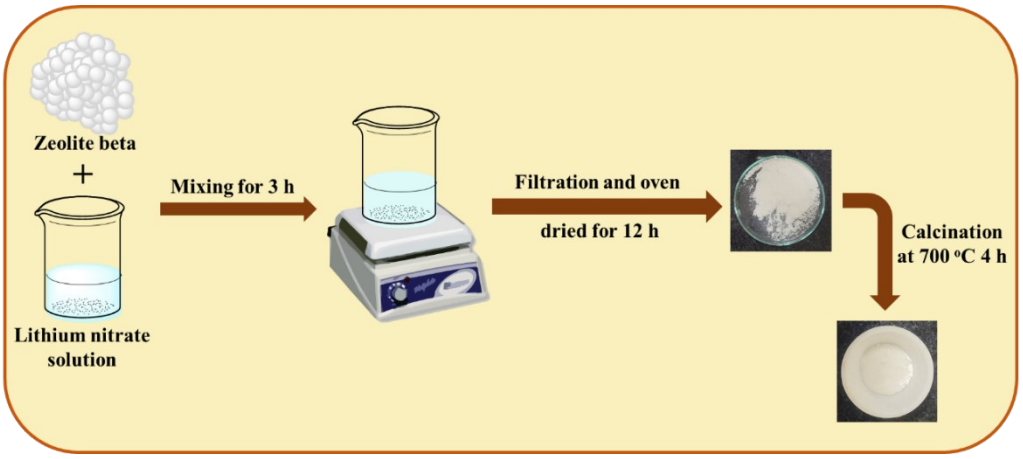

Fig. S1 Diagrammatic representation of Li-modified zeolite beta.

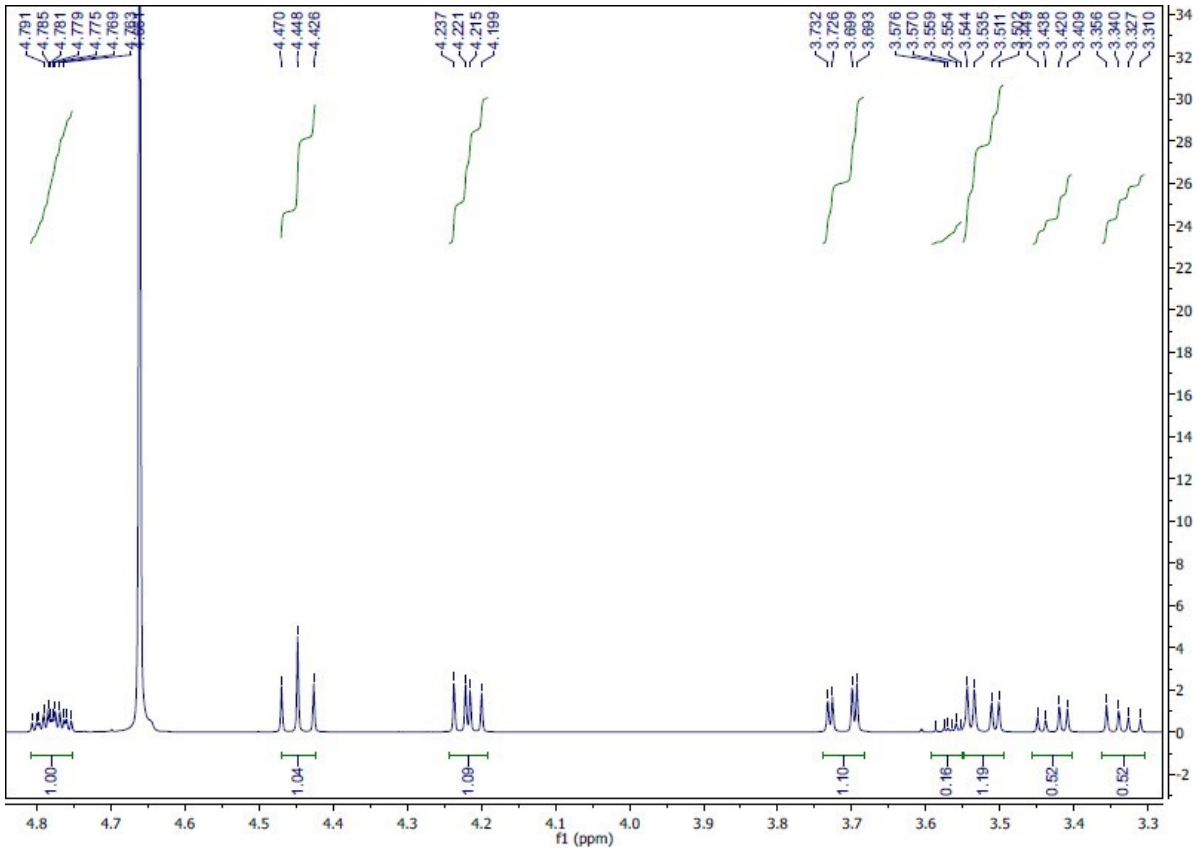

Fig. S2 ^{1}H NMR spectrum of the reaction mixture.

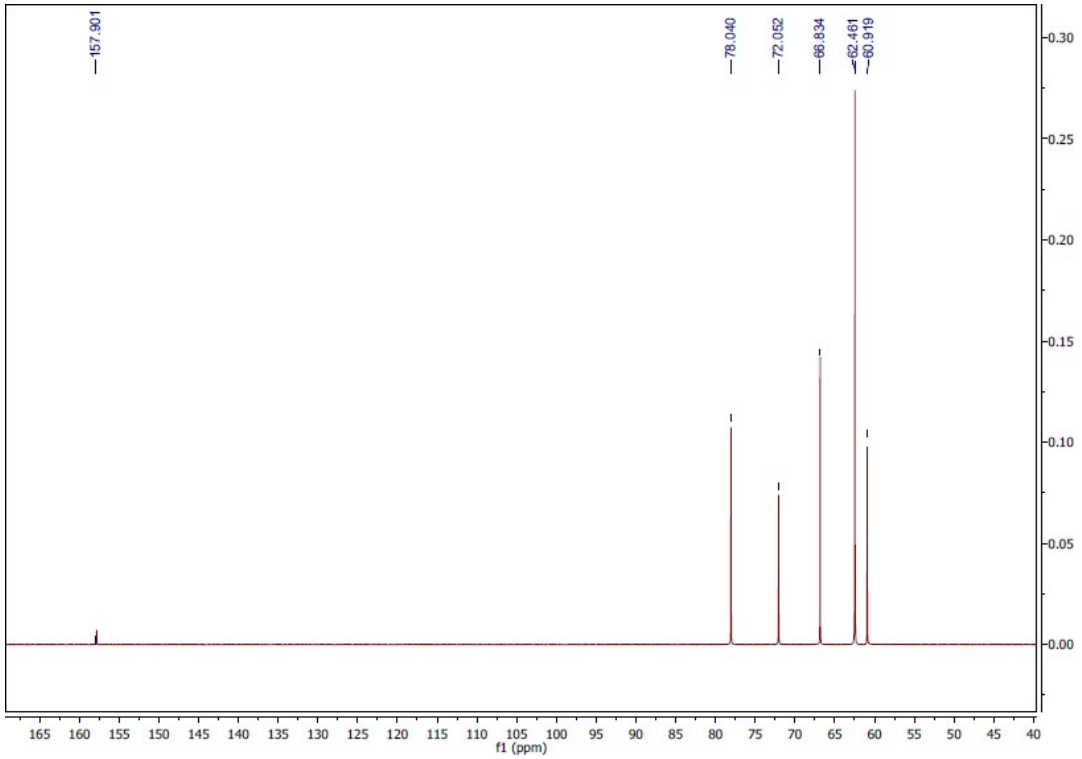

Fig. S3 ^{13}C NMR spectrum of the reaction mixture.

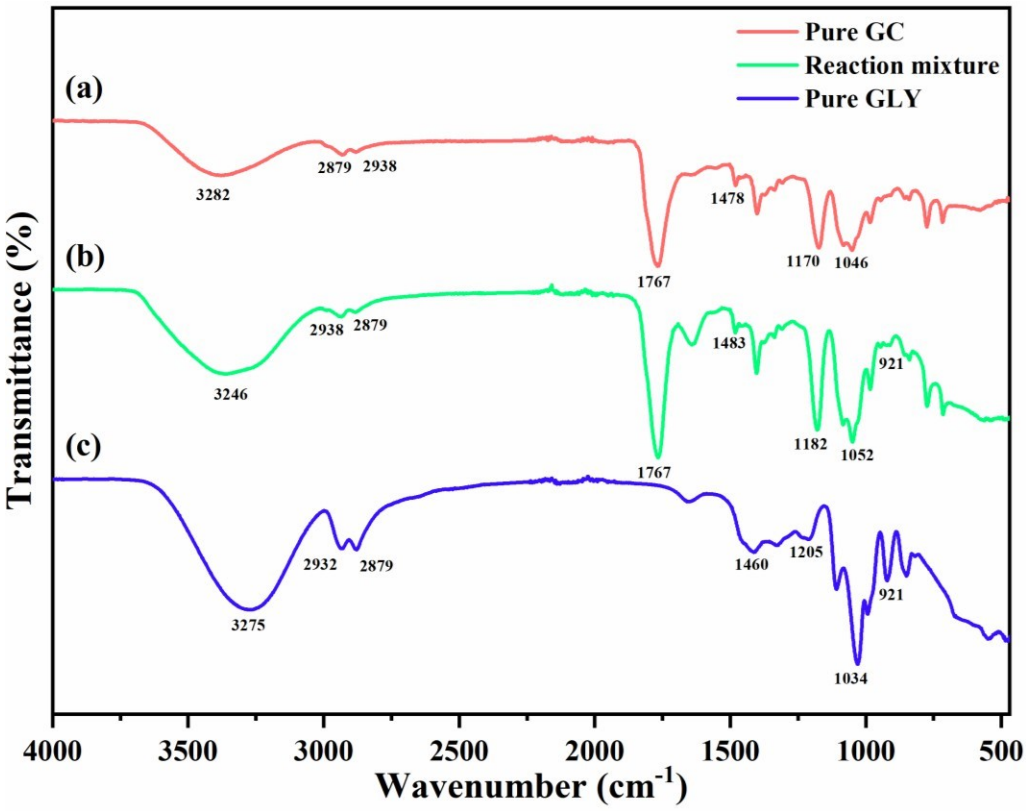

Fig. S4 FT-IR comparison of the reaction mixture with pure GC and GLY.

HRMS data

In the HRMS spectra of the final product, a signal at m/z 118.0502 corresponds to the mass of glycerol carbonate (118.0498). While the base peak observed at m/z 100.0639 corresponds to the fragment formed after the loss of water molecule from glycerol carbonate. A peak observed at m/z 95.8186 relates to the mass of tri-protonated glycerol (92.0938 + $3H^+$), indicating the presence of glycerol in the reaction mixture. Another peak observed at m/z 75.897 indicates the removal of water molecules from the GLY during the mass analysis.

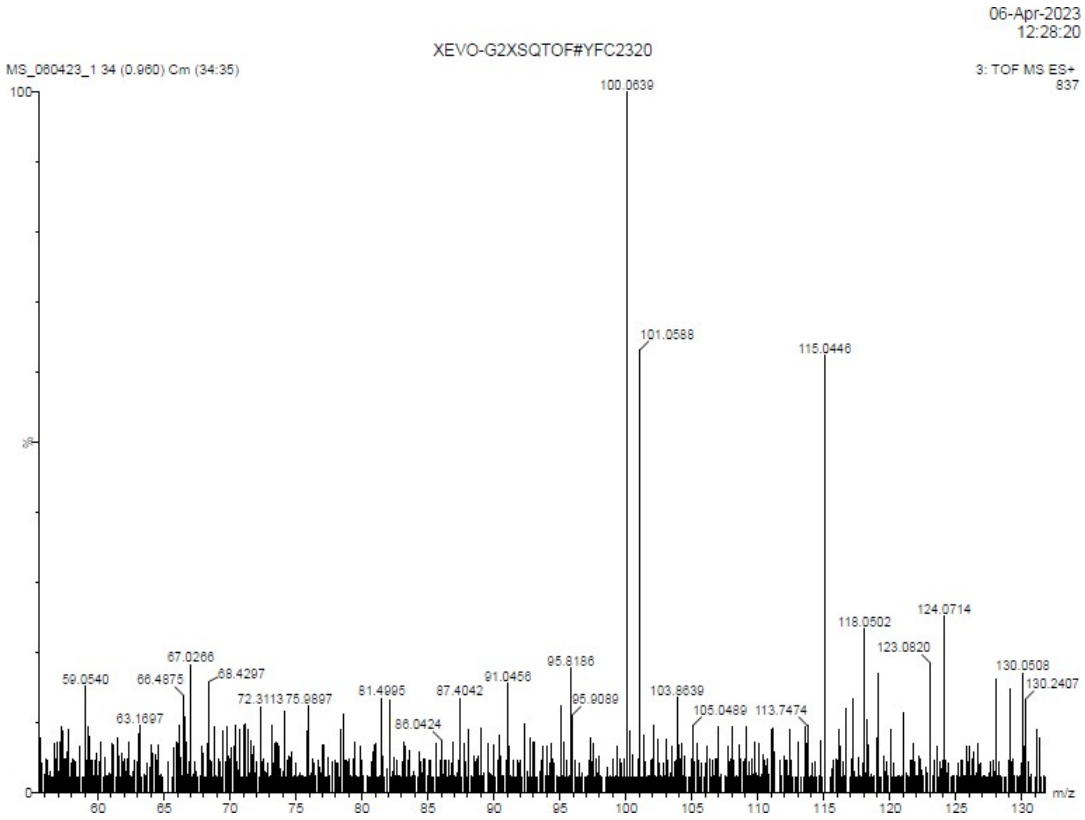

Fig. S5 HRMS of left-out glycerol and glycerol carbonate.

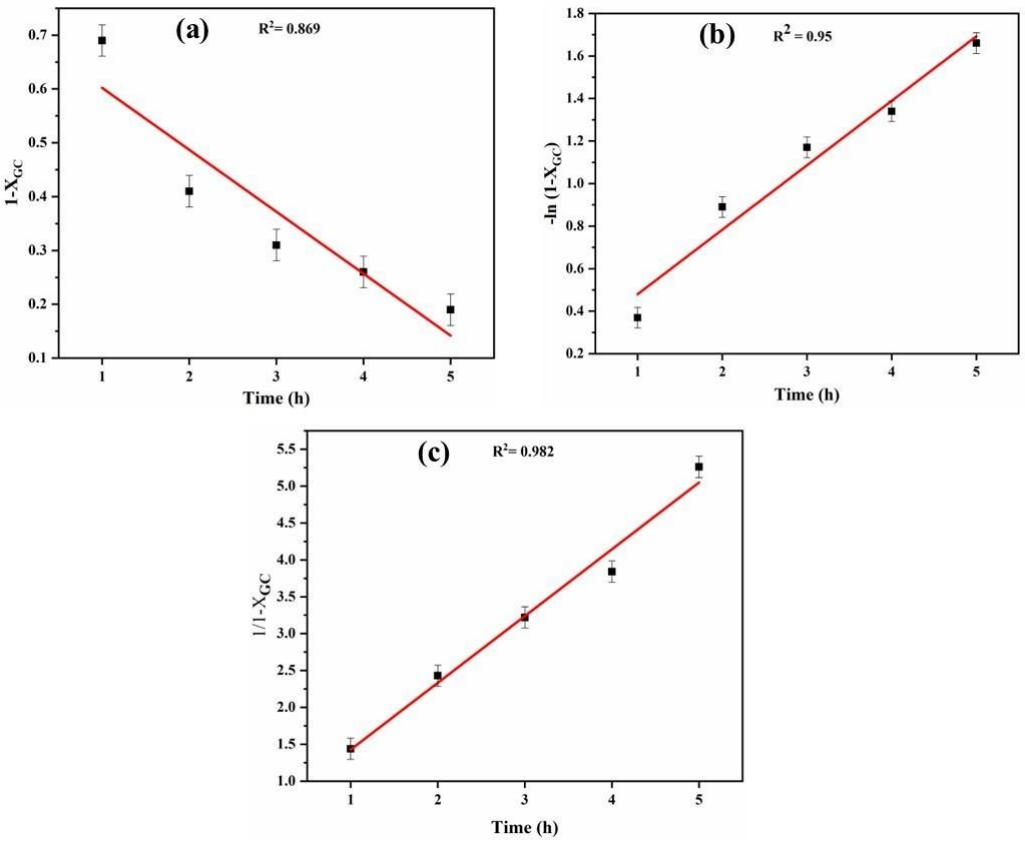

Fig. S6 A plot of (a) $1\text{-}X_{GC}$, (b) $-\ln(1\text{-}X_{GC})$, and $1/1\text{-}X_{GC}$ *versus* reaction time for zero, first, and second-order reaction (Reaction conditions: GLY:DMC mole ratio 1:5, $Li_{20}\beta$ dosage10 wt% w.r.t. GLY, temperature 95 ℃, time 5 h)