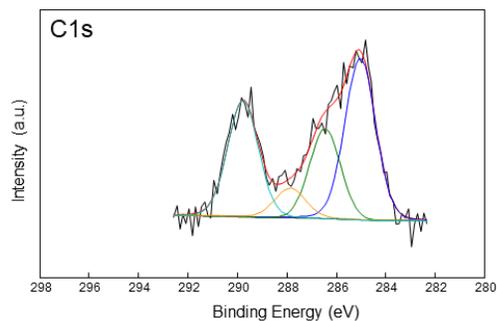


Supplementary Materials

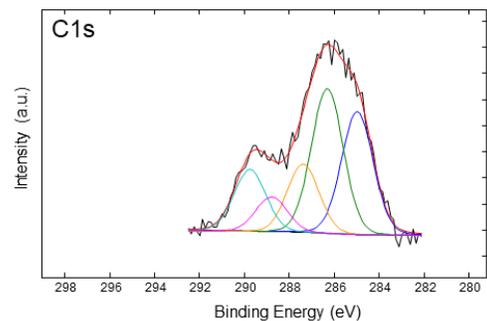
Table of Contents

1. Supplemental XPS analysis	<i>p. S2</i>
2. Full Spectra BET analysis	<i>p.S4</i>
3. Supplemental SEM images	<i>p. S7</i>
4. Samples HPLC GC data for recycle test	<i>p. S12</i>
5. HRMS data for cyclic products	<i>p. S16</i>
6. ¹ H-NMR and ¹³ C-NMR spectra of reaction mixture	<i>p.S17</i>



A

	BE(eV)	Assignment	Peak Area %
1	285.0	C-C/C-H	41.3
2	286.5	C-OH/C-OR	21.8
3	287.9	C=O	7.5
4	289.8	Carbonate	29.4



B

	BE(eV)	Assignment	Peak Area %
1	285.0	C-C/C-H	28.3
2	286.3	C-OH/C-OR	33.5
3	287.4	C=O	15.8
4	288.8	C(O)OH/C(O)OR	8.0
5	289.8	Carbonate	14.4

Figure S1. C1s spectra for the catalyst La(III)@KIT-6 before (A) and after (B) three recycling experiments.

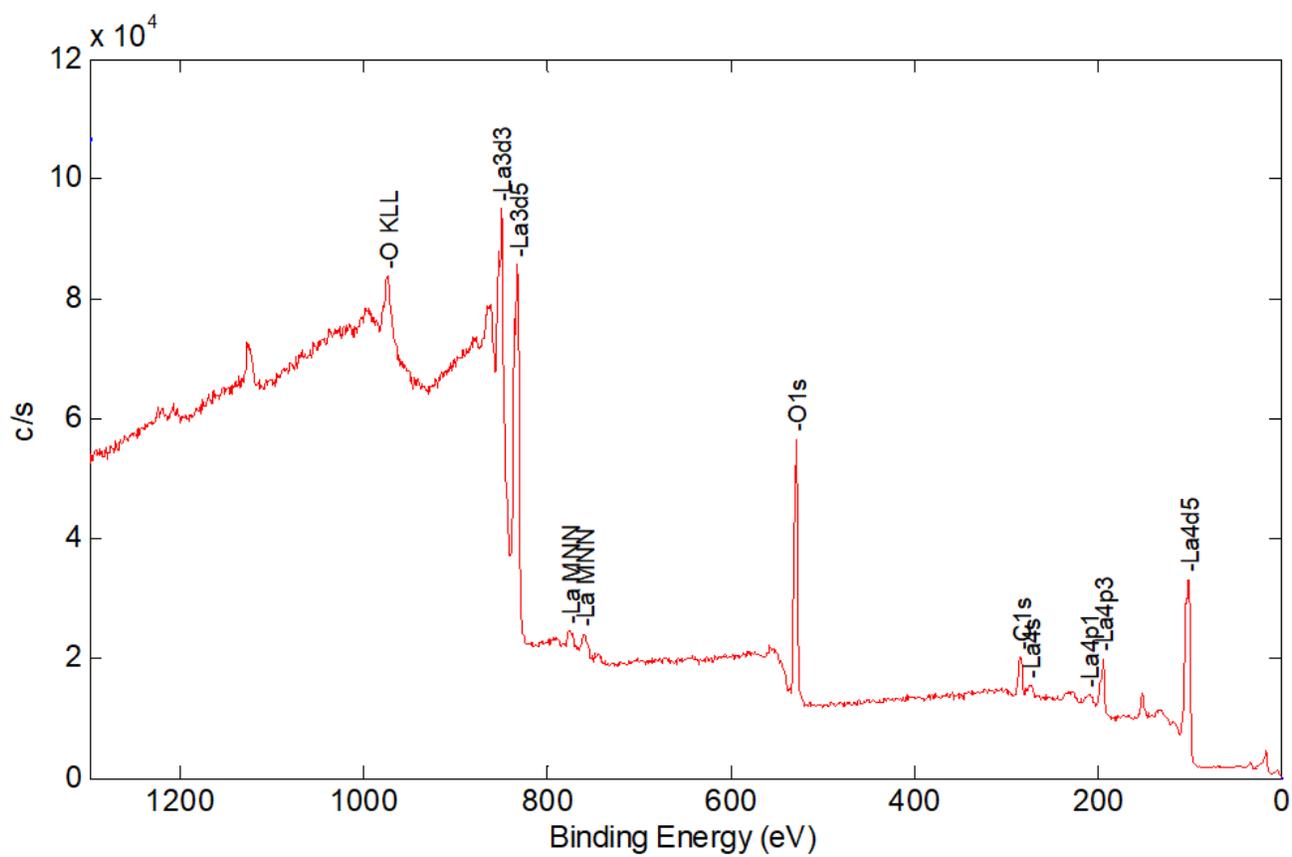


Figure S2. Survey spectrum of recovered La(III)@KIT-6 after three recycling experiments.

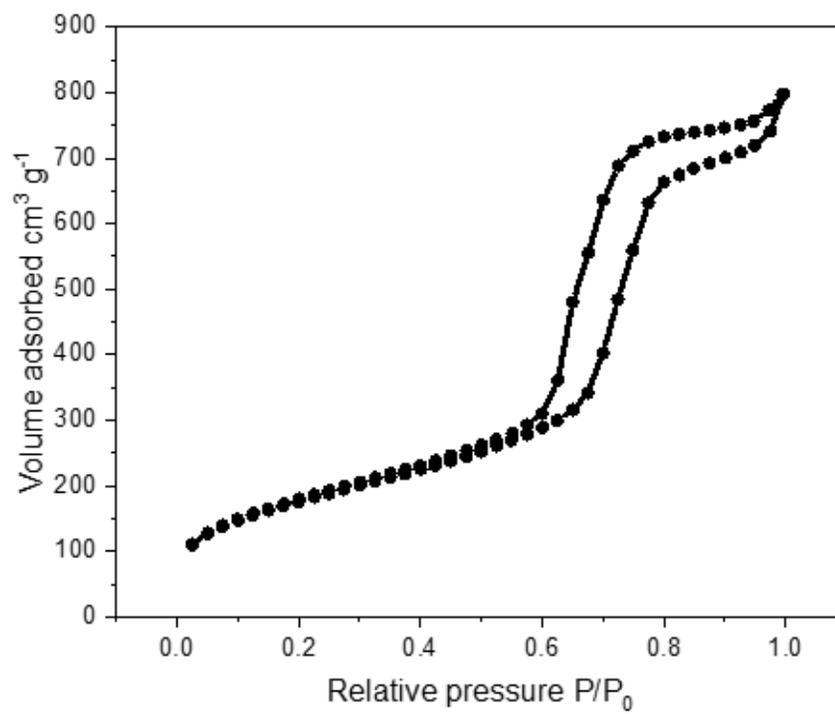


Figure S3. N₂ adsorption–desorption isotherm for KIT-6

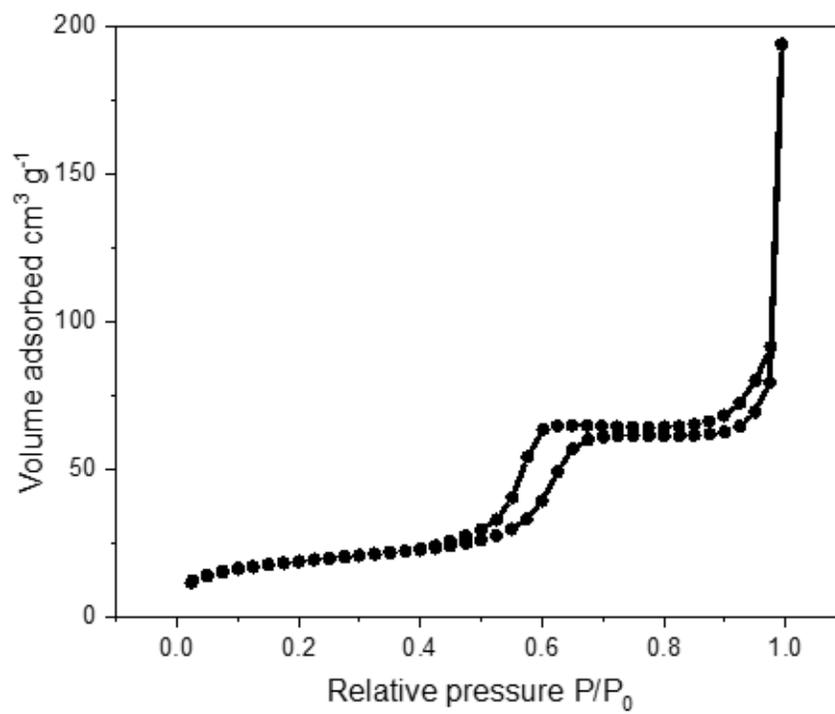


Figure S4. N₂ adsorption–desorption isotherm for La(III)O-KIT-6 catalyst 2

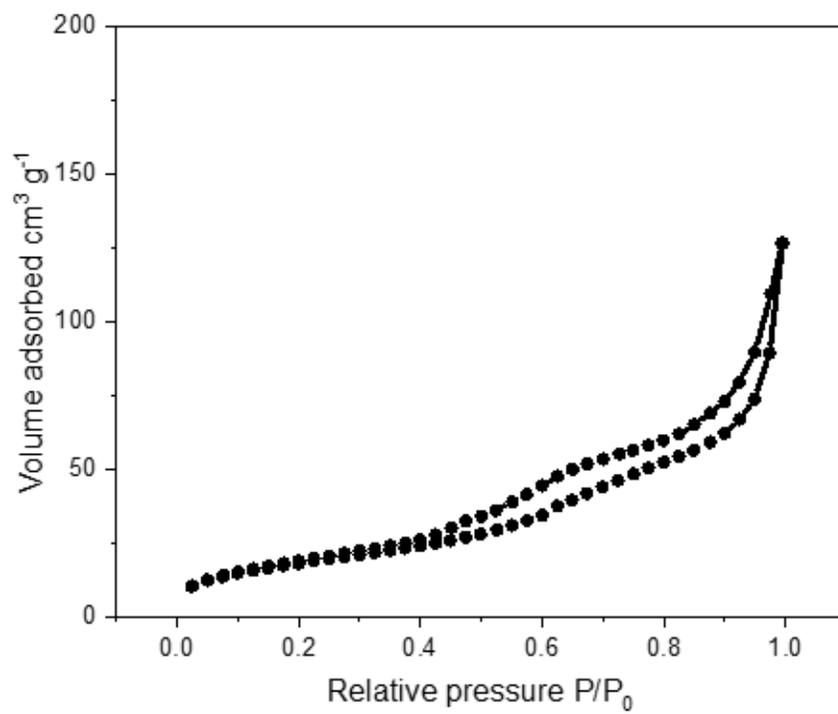


Figure S5. N₂ adsorption–desorption isotherm for La(III)O-KIT-6 after III cycle (2')

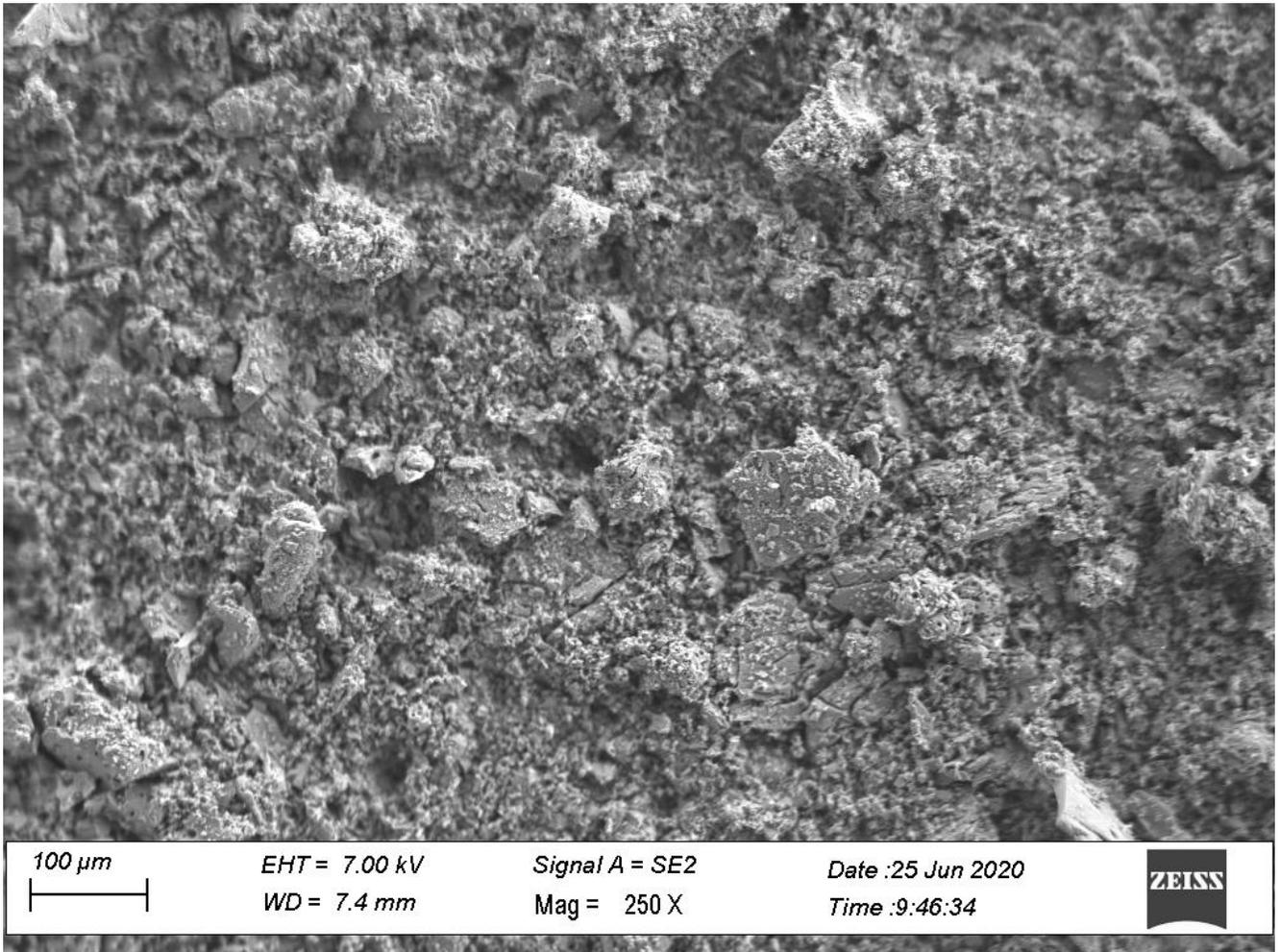


Figure S6. SEM image 100 μ m of KIT-6.

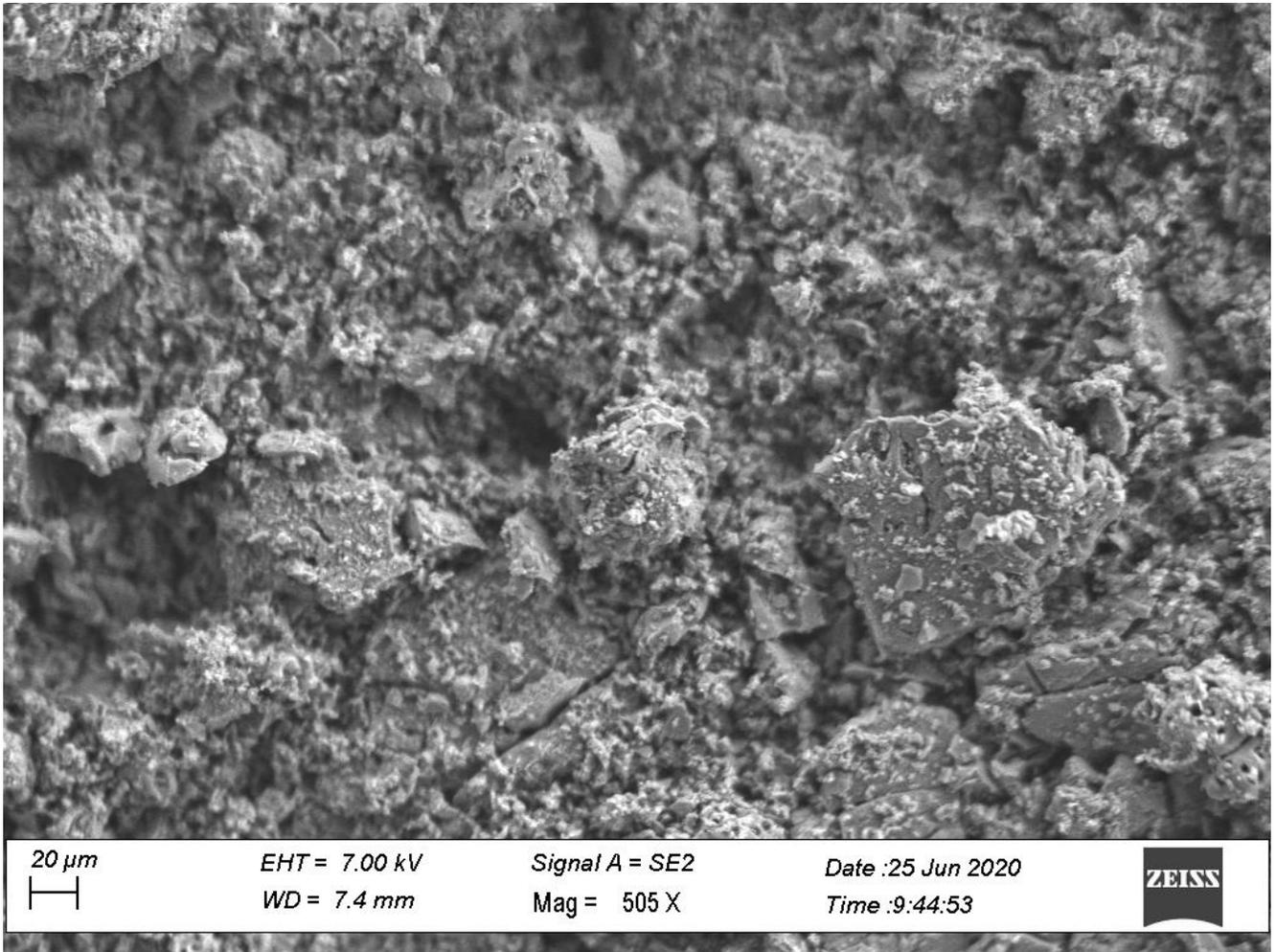


Figure S7. SEM image 20 μm of KIT-6.

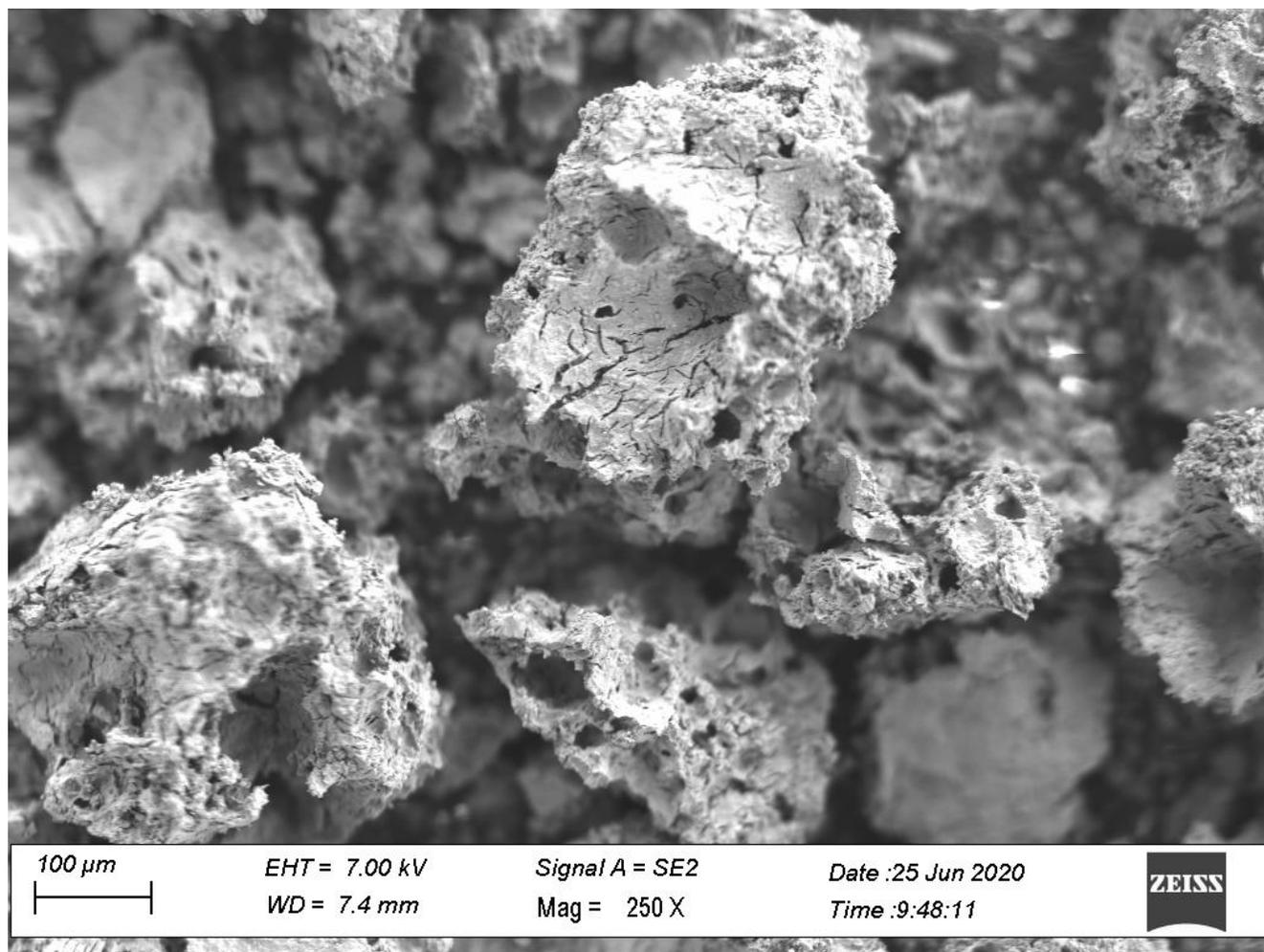


Figure S8. SEM image 100 μ m of La(III)OKIT-6.

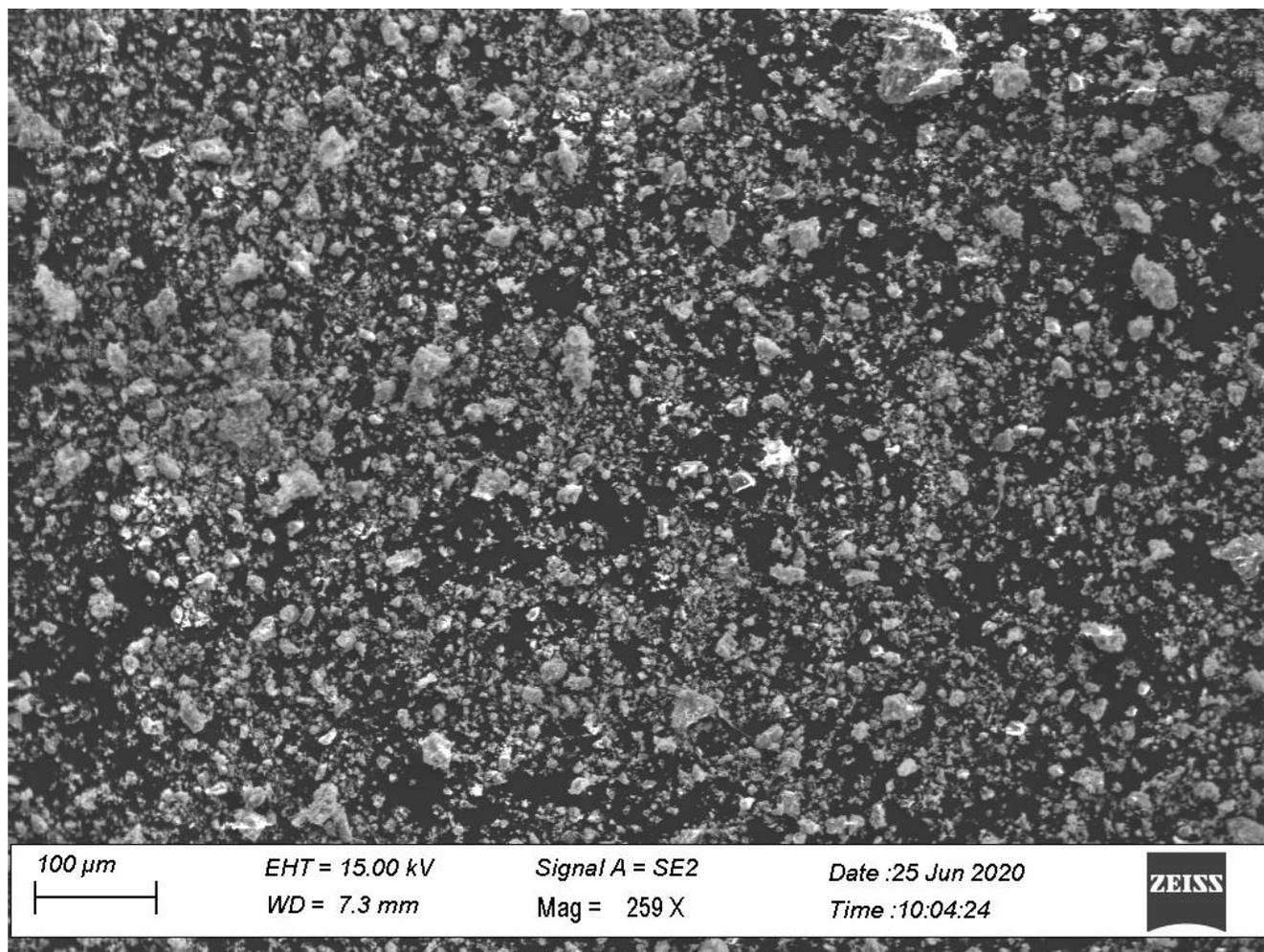


Figure S9. SEM image 100 μ m of La(III)OKIT-6 after three recycling experiments.

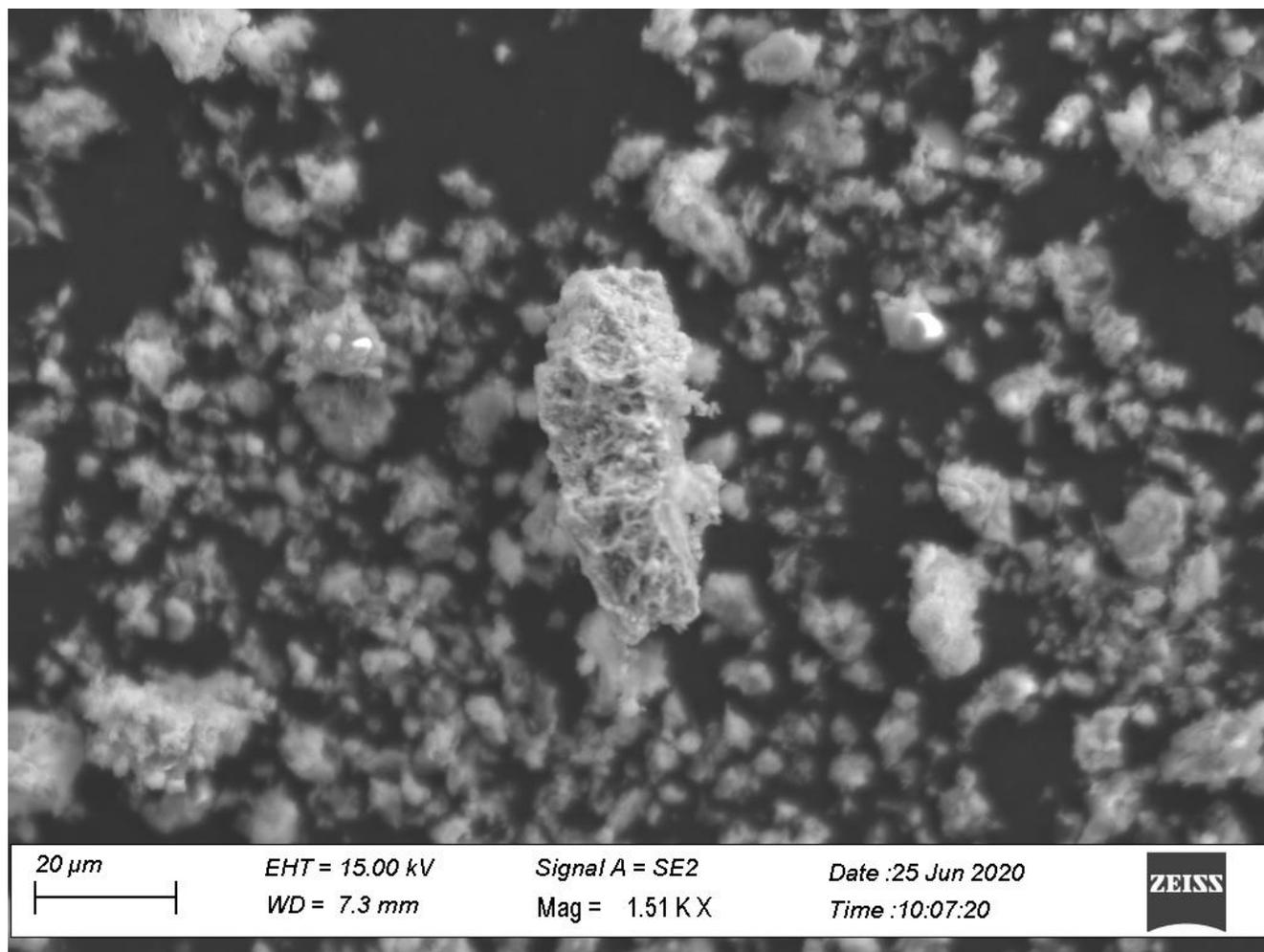


Figure S10. SEM image 20 μm of La(III)OKIT-6 after three recycling experiments.

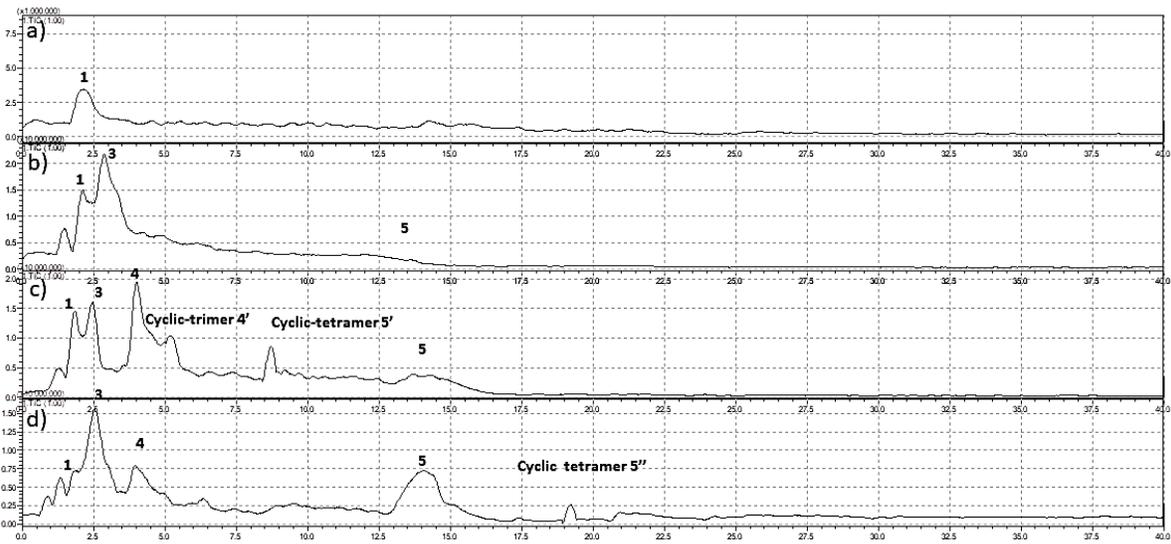


Figure S11. HPLC chromatograms at 0 h (a), 8 h (b), 16 h (c) and 24 h (d) reaction time. C18 Column Supelcosil (15 cm × 4.6 mm id), a solvent program starting with H₂O to Methanol for 40 minutes, and a flow rate of 1.0 mL/min, IT-TOF detector.

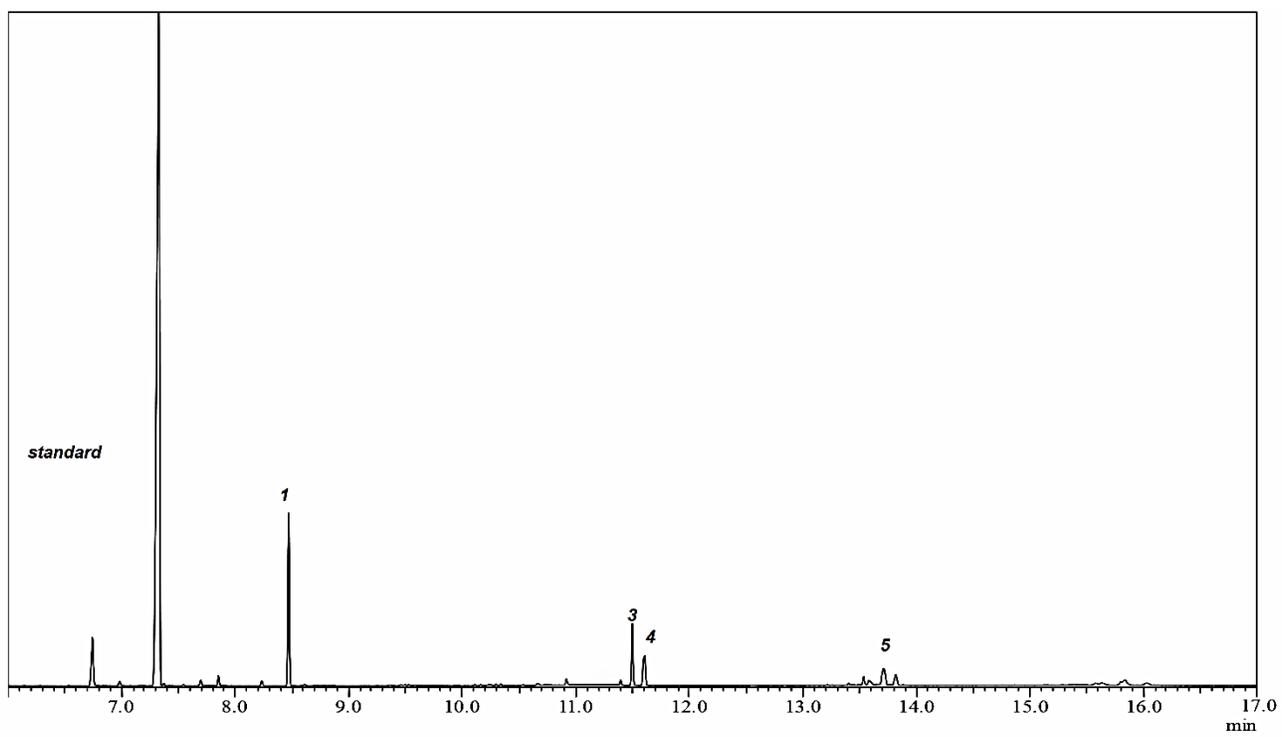


Figure S12. GC/MS analysis of the 1st catalytic run with La(III)OKIT-6.

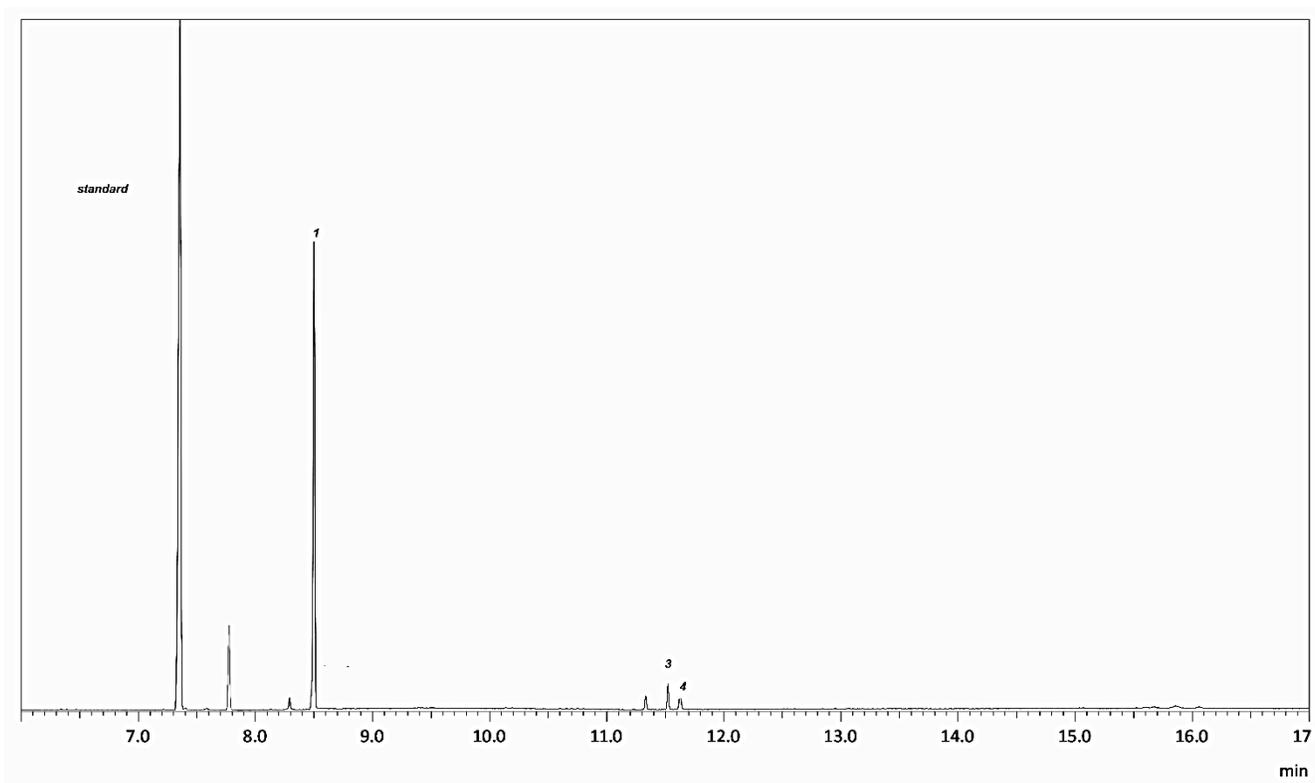


Figure S13. GC/MS analysis of 2nd catalytic run with La(III)OKIT-6.

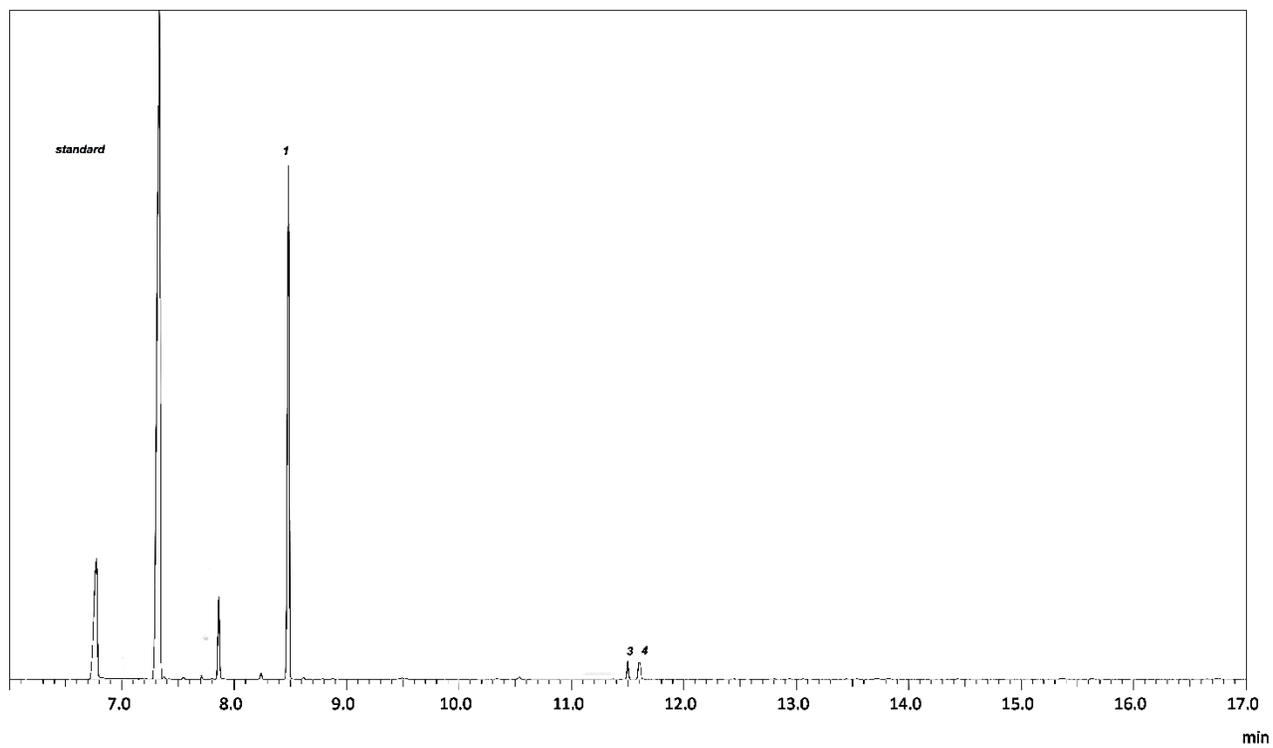


Figure S14. GC/MS analysis of 3rd catalytic run with La(III)OKIT-6.

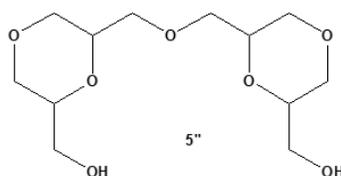
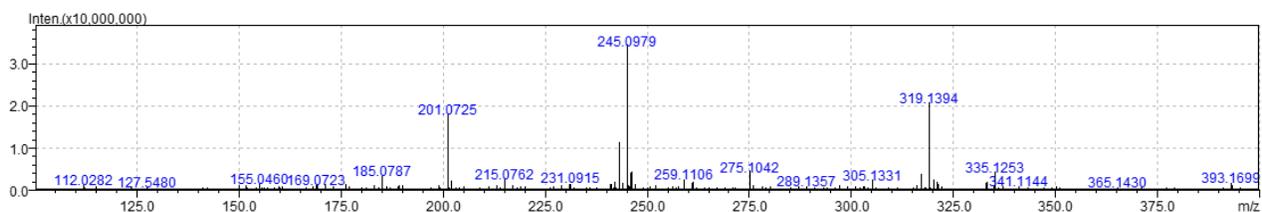
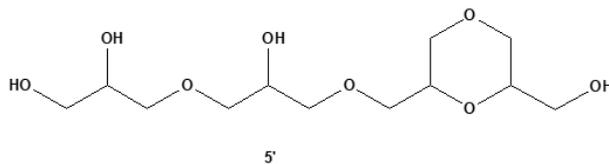
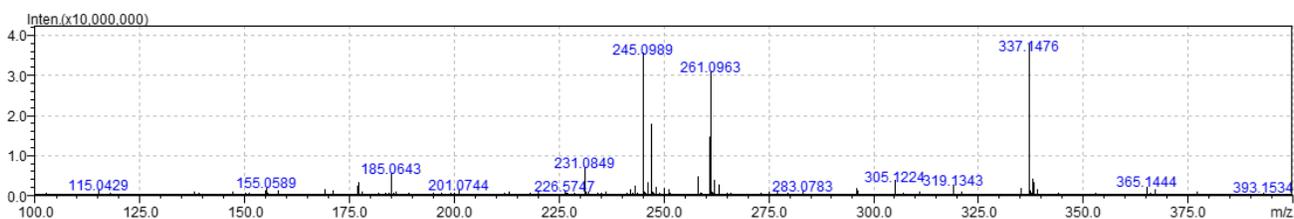
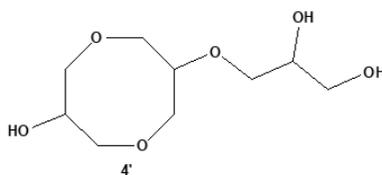
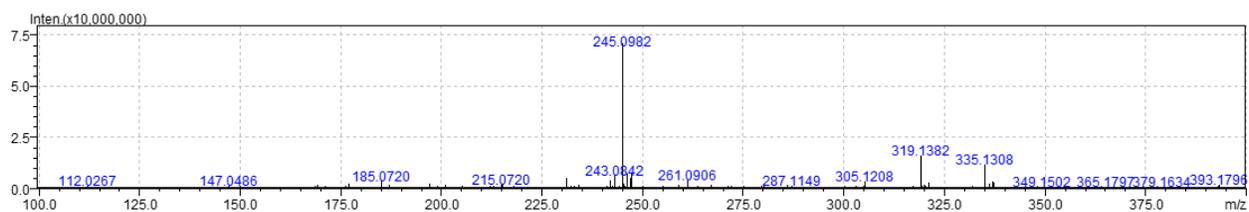


Figure S15. HRMS of linear and cyclic hybrid oligomers.

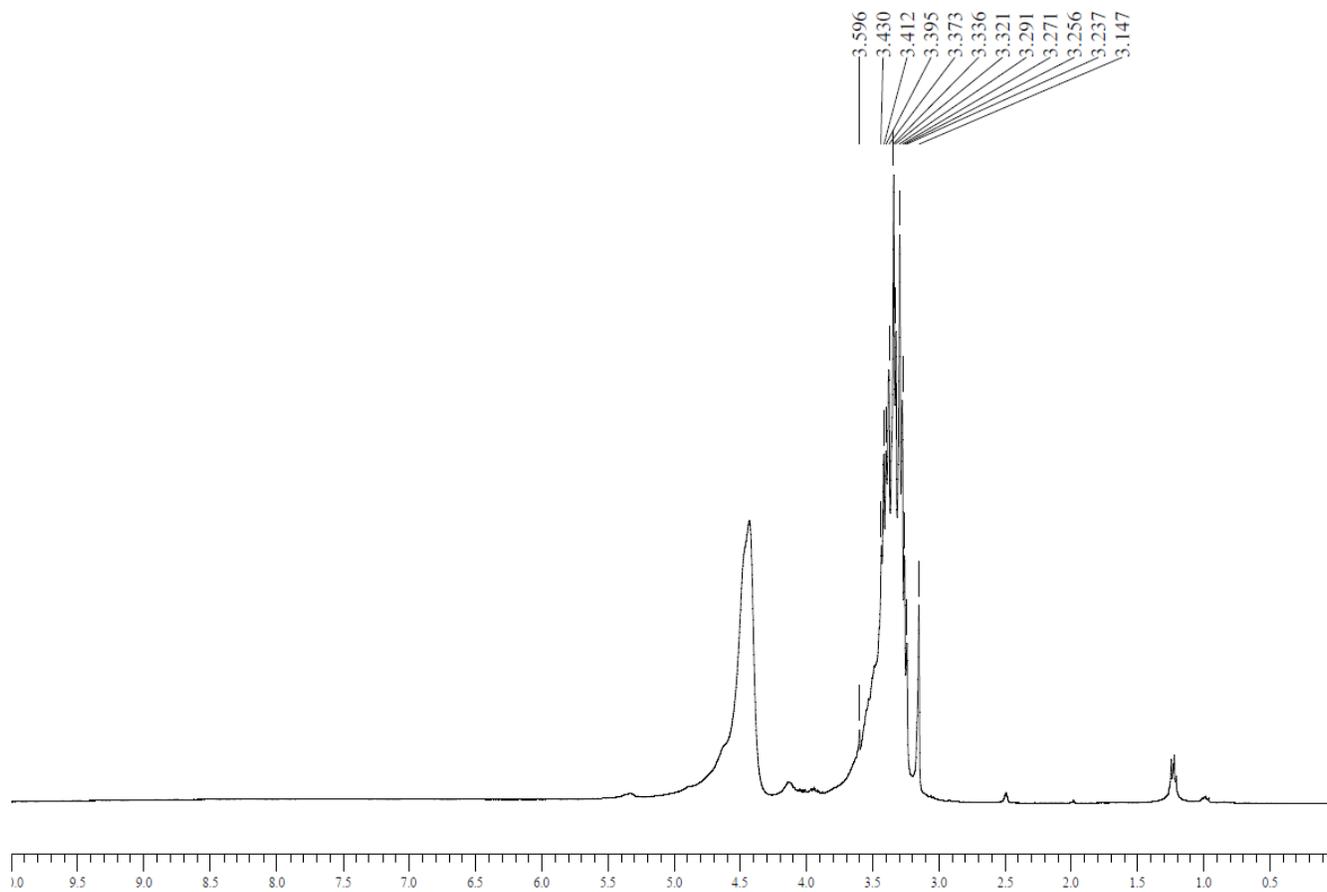


Figure S16. $^1\text{H-NMR}$ (300 MHz, DMSO- d_6) spectrum of reaction mixture at 24 hours.

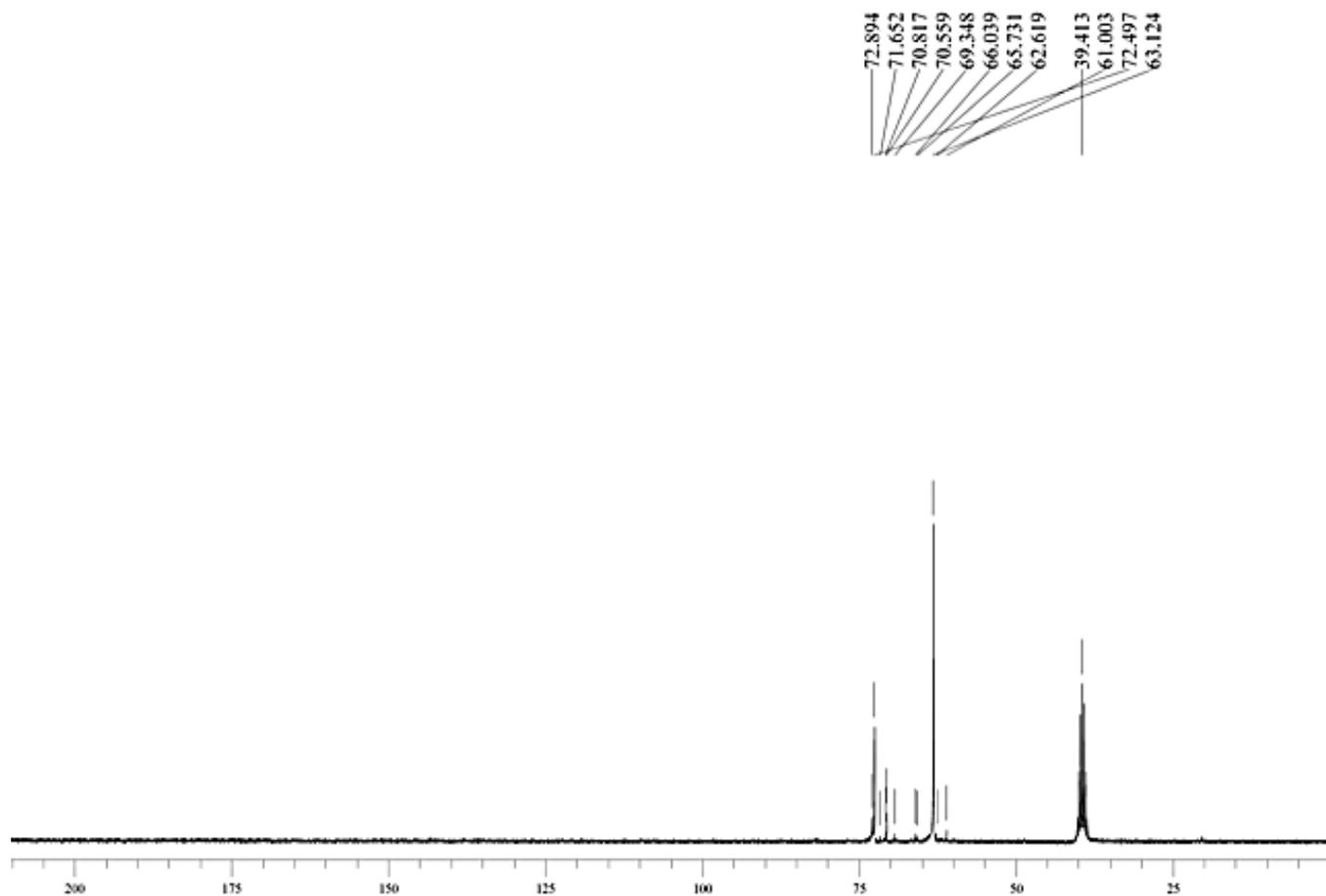


Figure S17. ^{13}C -NMR (75 MHz, DMSO- d_6) spectrum of reaction mixture at 24 hours.