Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Materials

Efficient conversion of glucose to 5-hydroxymethylfurfural by using bifunctional partially hydroxylated AlF_3

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Table S1 Acid distribution of AlF_3-150, AlF_3-250, and AlF_3-350

Catalyst	Acid distribution (mmol/g)[a]	
	Brønsted acid	Lewis acid
AlF_3-150	0.0305	0.0669
AlF_3-250	0.0142	0.0434
AlF_3-350	0.0081	0.0276

[a] Deduced from the intensity of the band of Brønsted acid sites located at 1540 cm^{-1} and Lewis acid sites at 1450 cm^{-1} by using FT-IR of adsorbed pyridine.

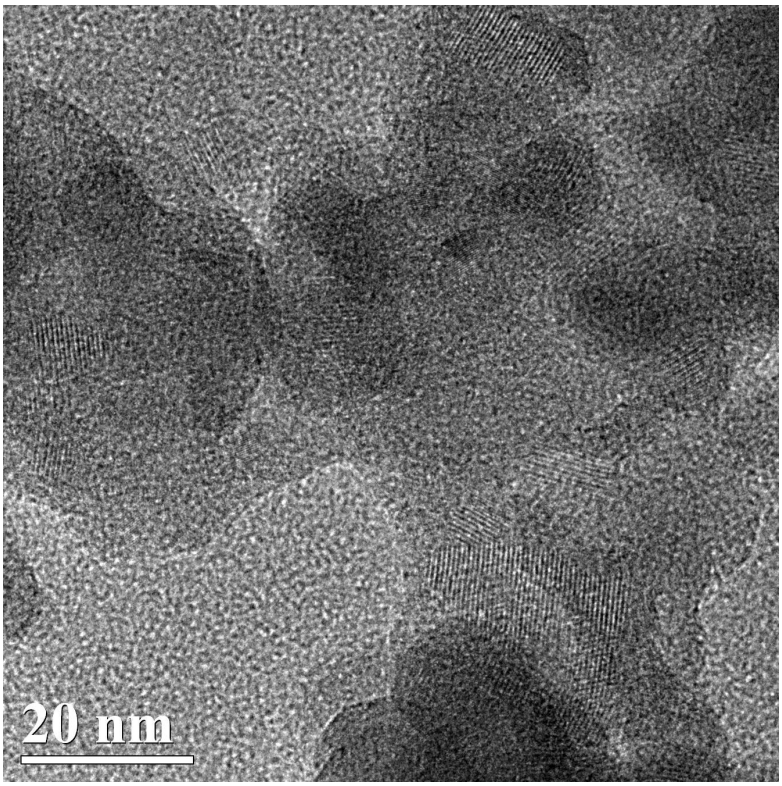

Fig. S1. TEM image of AlF_3-150 sample

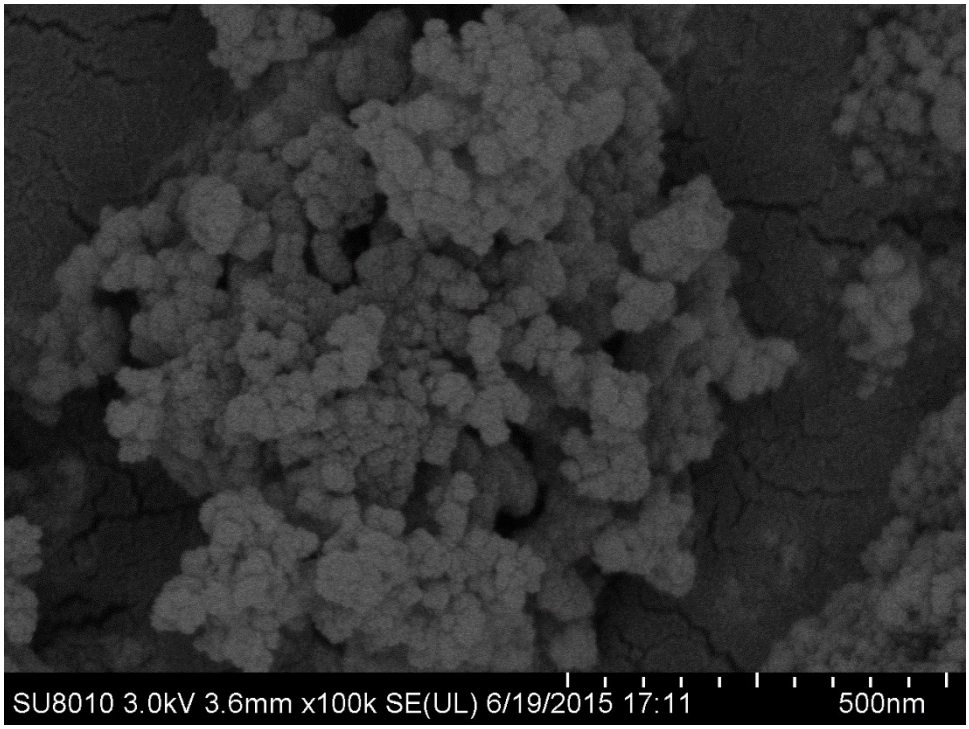

Fig. S2. SEM image of AlF_3-150 sample

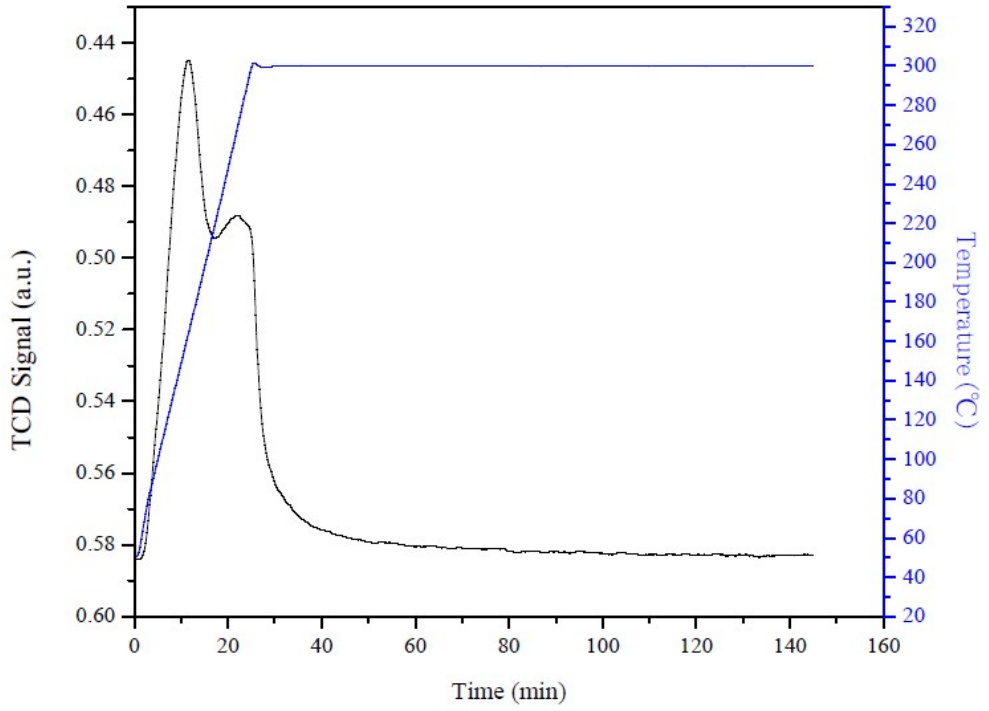

Fig. S3. NH_3-TPD profile of AlF_3-150 sample

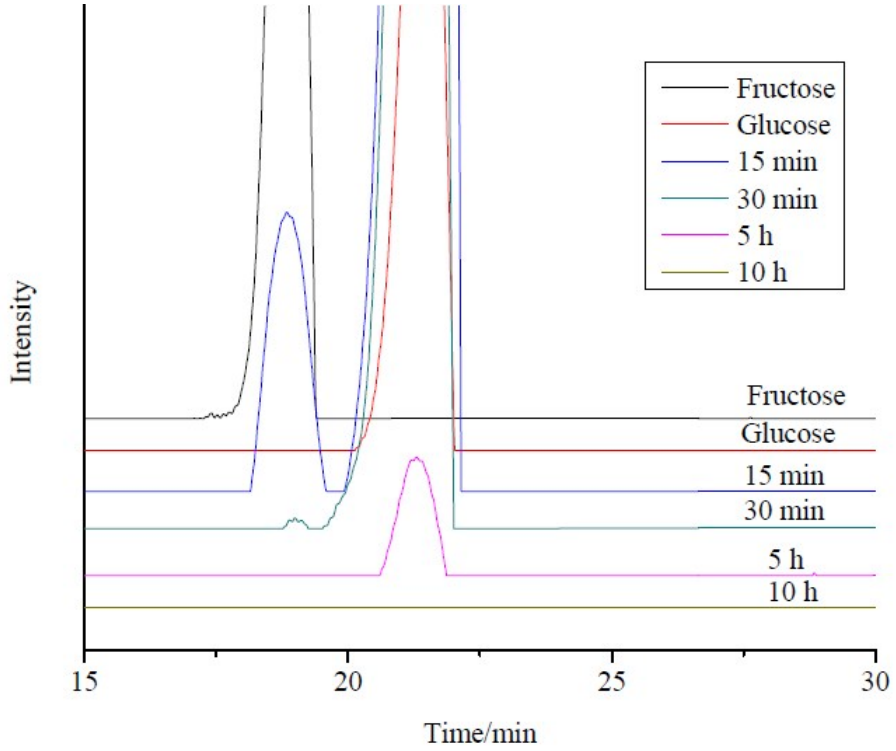

Fig. S4. HPLC images of the reaction mixture after reacting for 15 min, 30 min, 5 h and 10 h (Reaction conditions: 50 mg glucose, 1.0 g DMSO, 20 mg AlF_3-150, and 140 ºC).

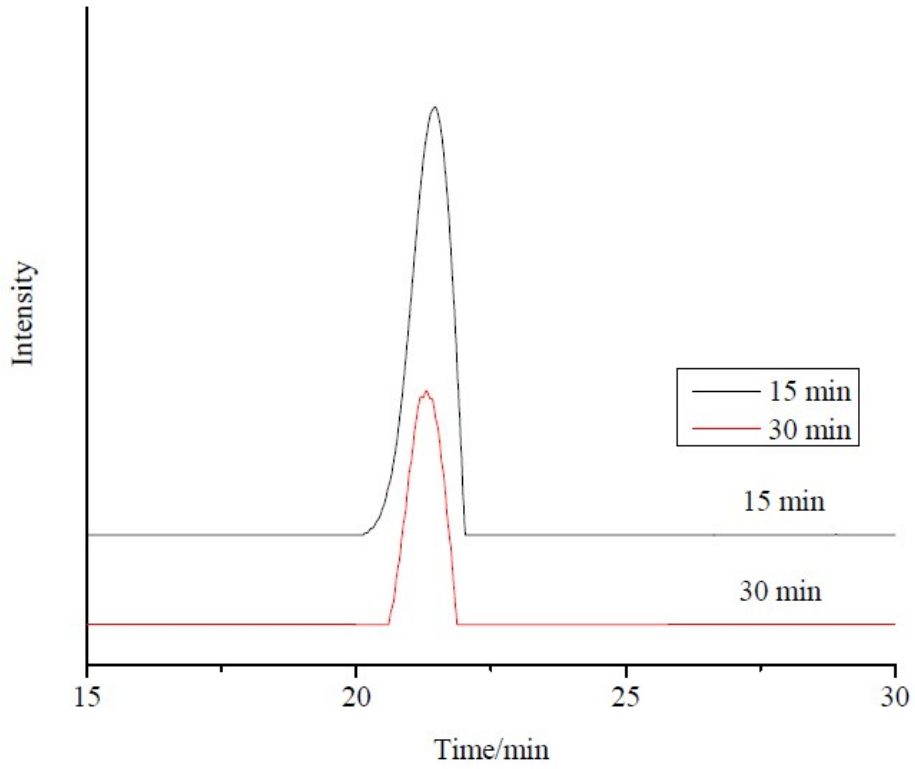

Fig. S5. HPLC images of the reaction mixture catalyzed by HCl for 15 and 30 min (Reaction conditions: 50 mg glucose, 1.0 g DMSO, 20 mg 0.01wt% HCl, and 140 ºC).

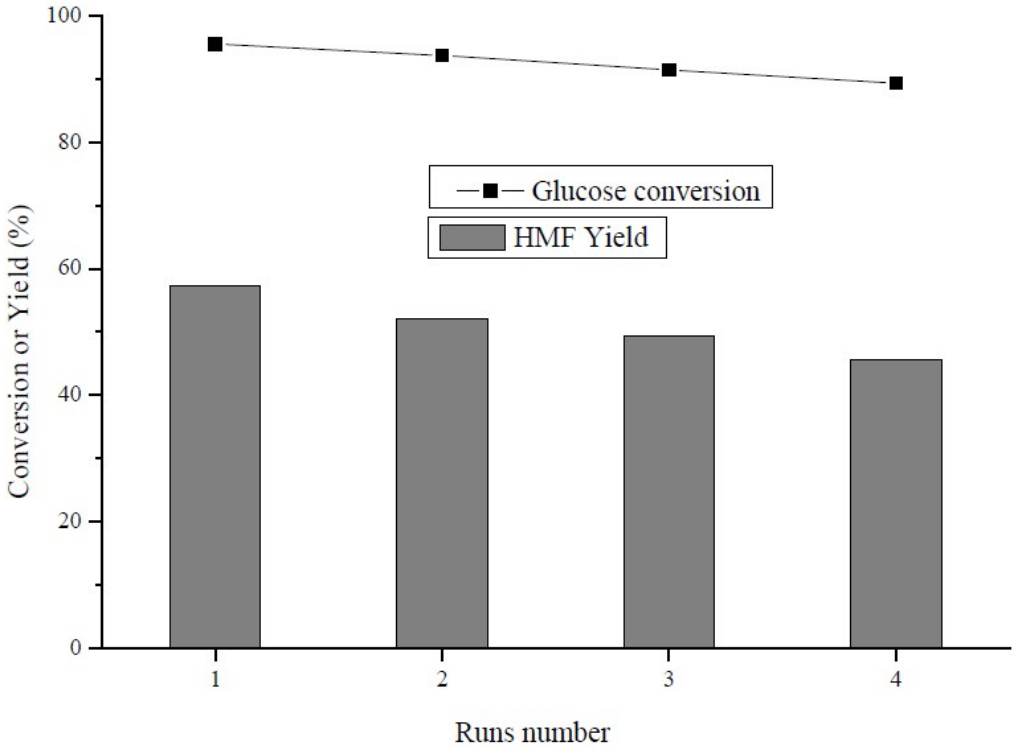

Fig. S6. Recyclability of AlF_3-150 in glucose-to-HMF conversion (Reaction conditions: 50 mg glucose, 1.0 g DMSO, 20 mg catalyst, 140 ºC, and 10 h).

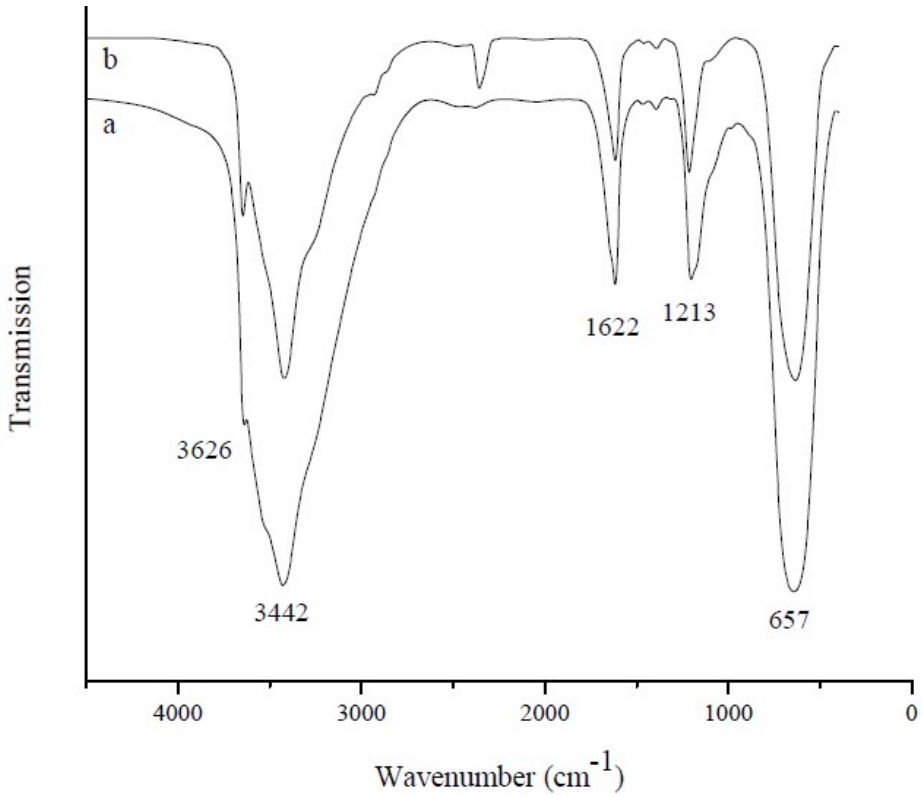

Fig. S7. FT-IR spectra of (a) fresh and (b) reused AlF_3-150 samples

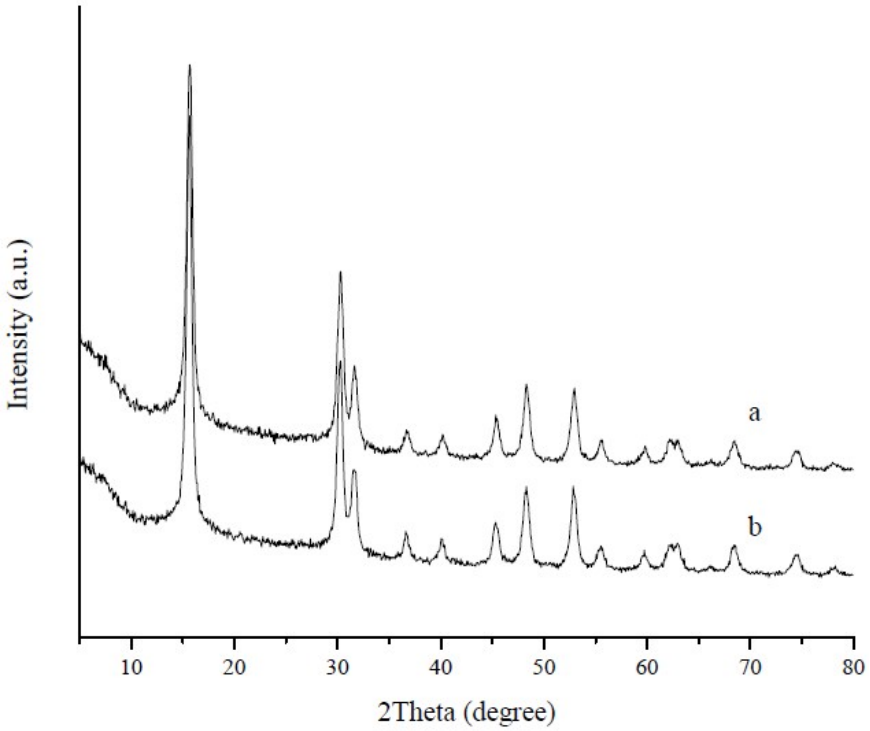

Fig. S8. XRD patterns of (a) fresh and (b) reused AlF_3-150 samples