

Supporting Information

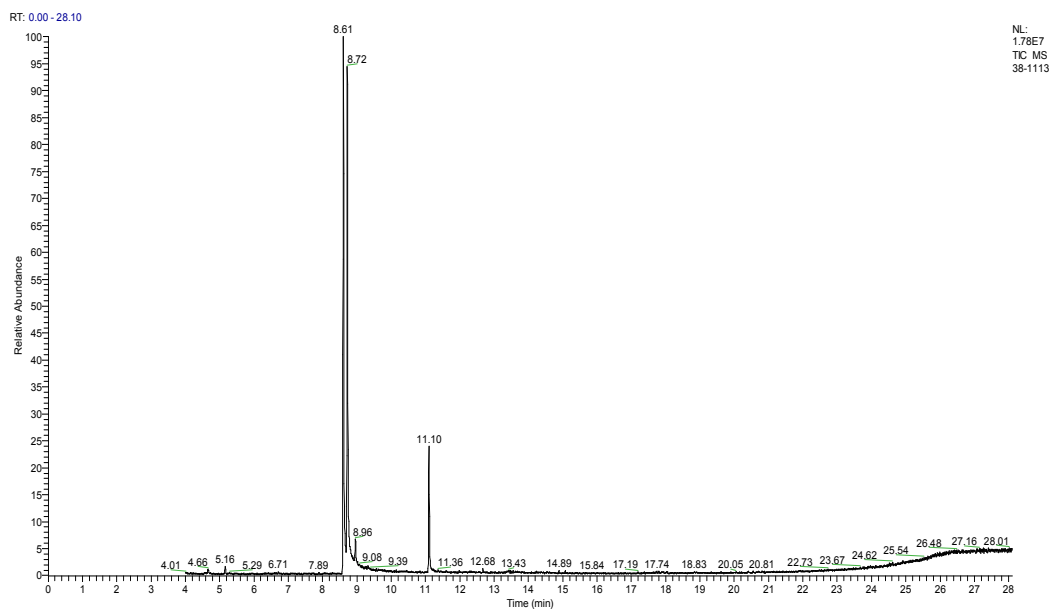


Fig. S1 GC-MS spectra for the products of the CTH of HMF in ethanol media

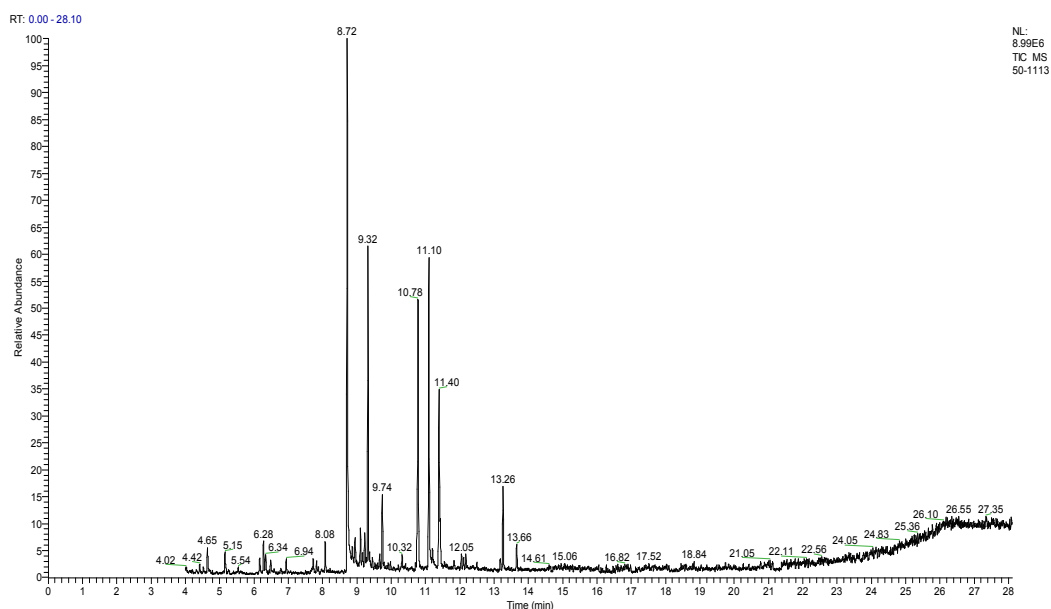


Fig. S2 GC-MS spectra for the products of the CTH of HMF in ethanol media with O₂ as additives

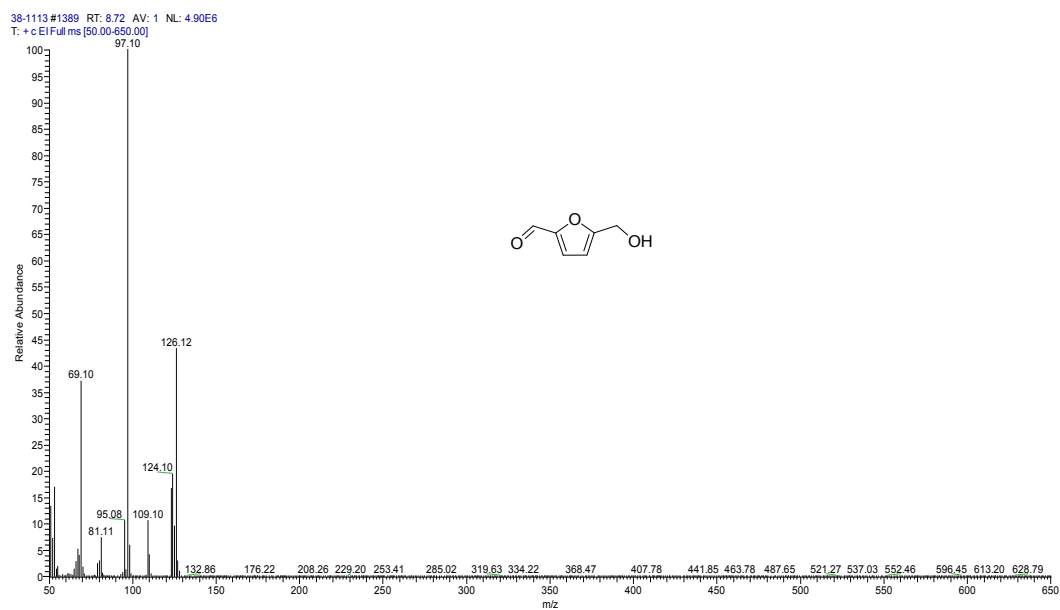


Fig. S3 MS spectrum for HMF

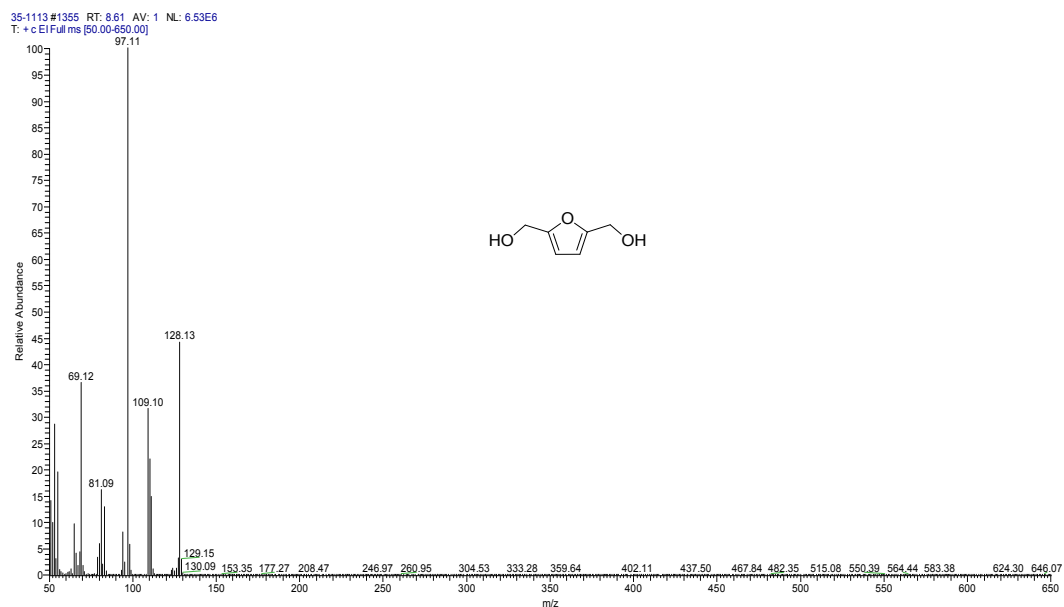


Fig. S4 MS spectrum for BHMF

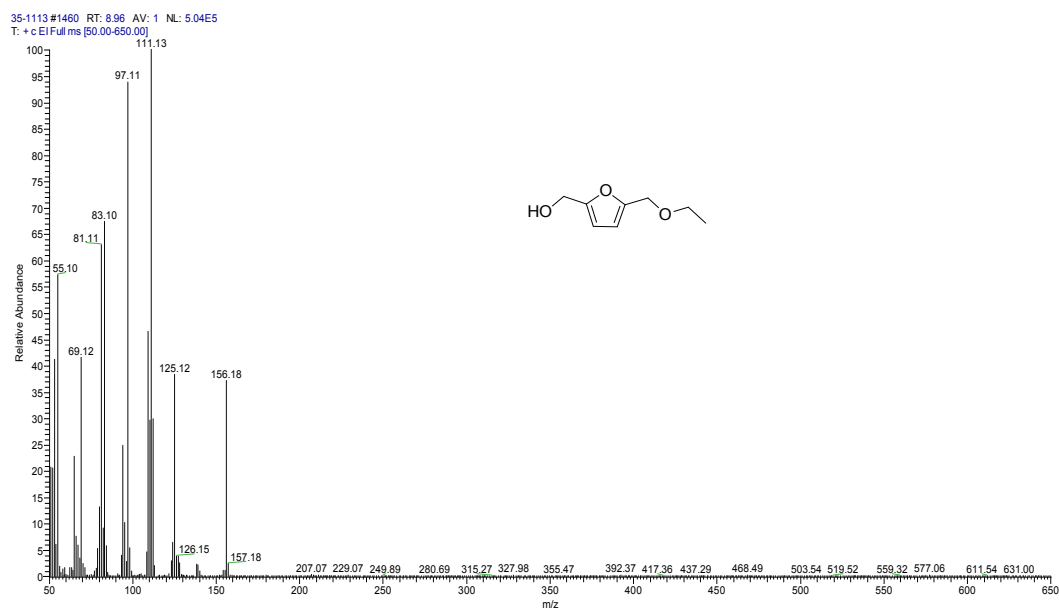


Fig. S5 MS spectrum for EFMA

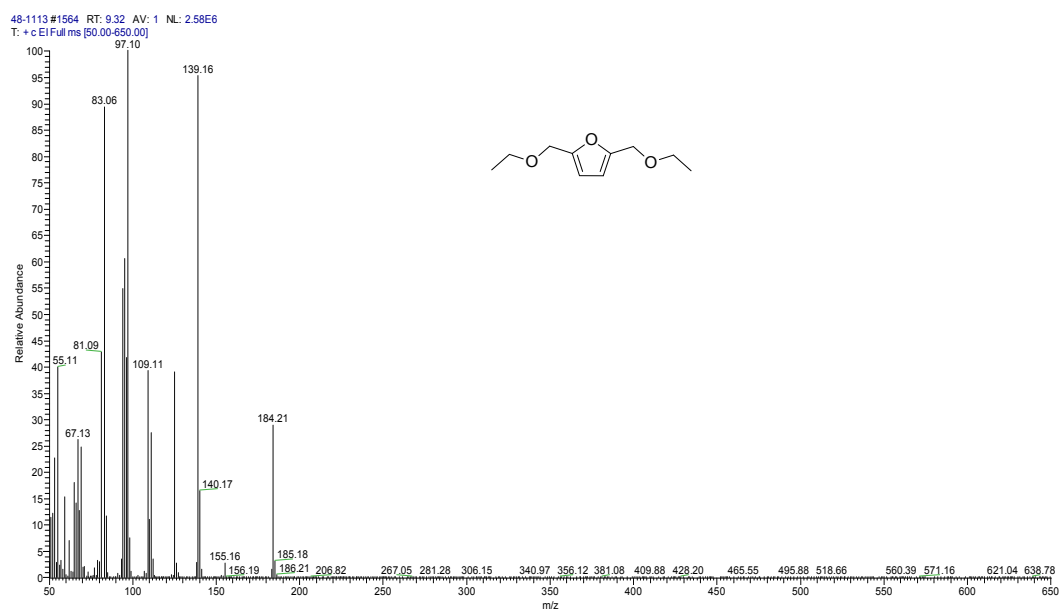


Fig. S6 MS spectrum for BEMF

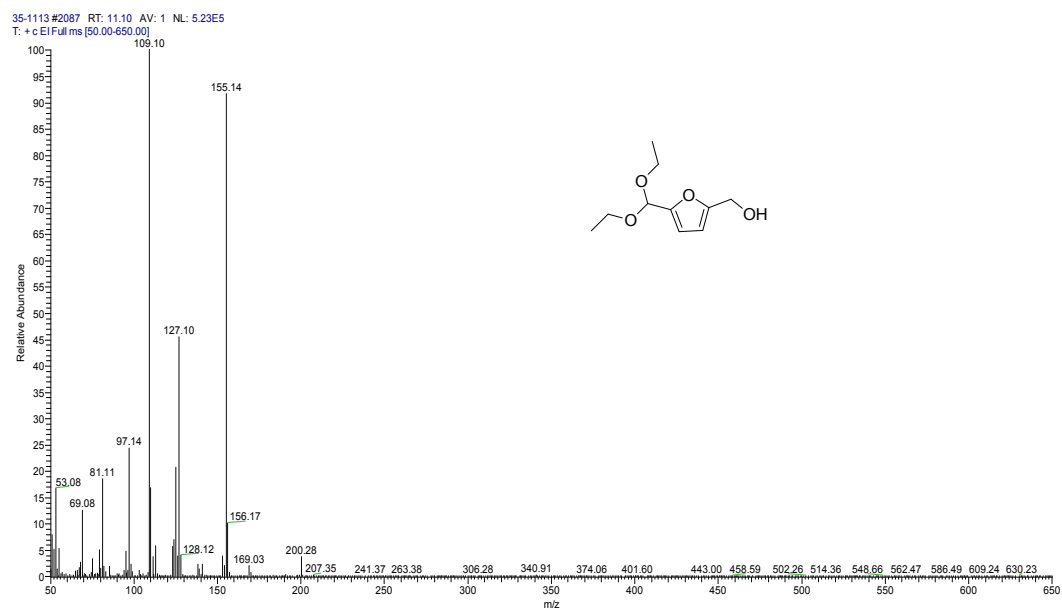


Fig. S7 MS spectrum for HMFDEA

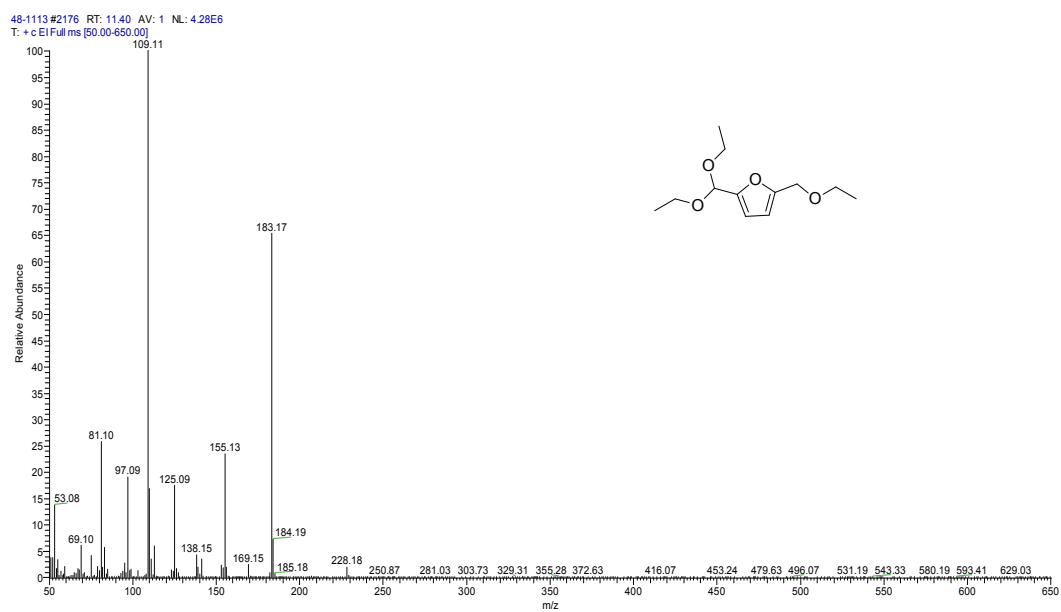


Fig. S8 MS spectrum for EMFDEA

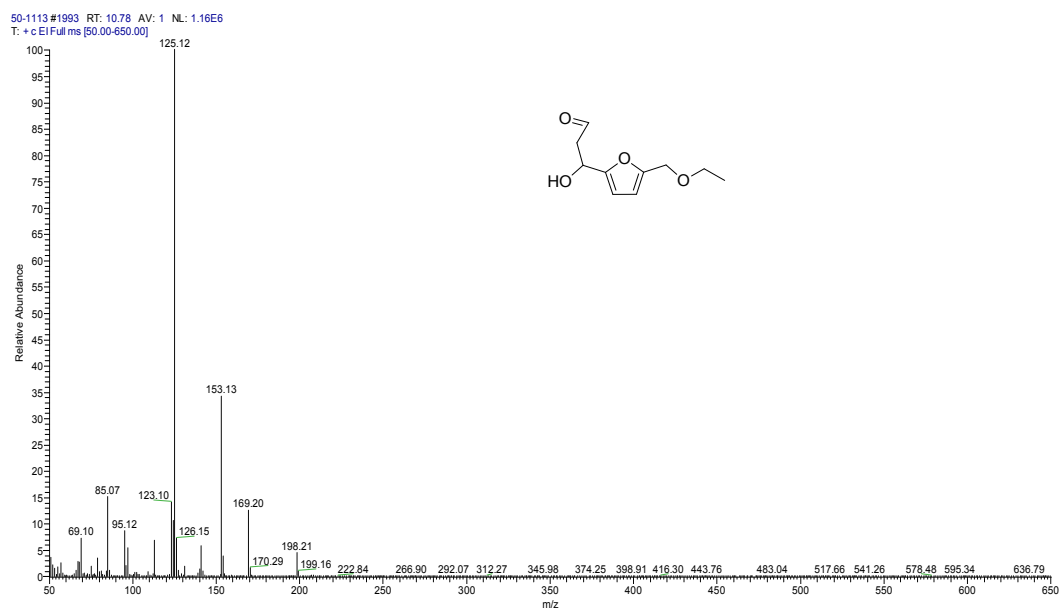


Fig. S9 MS spectrum for Compound 1

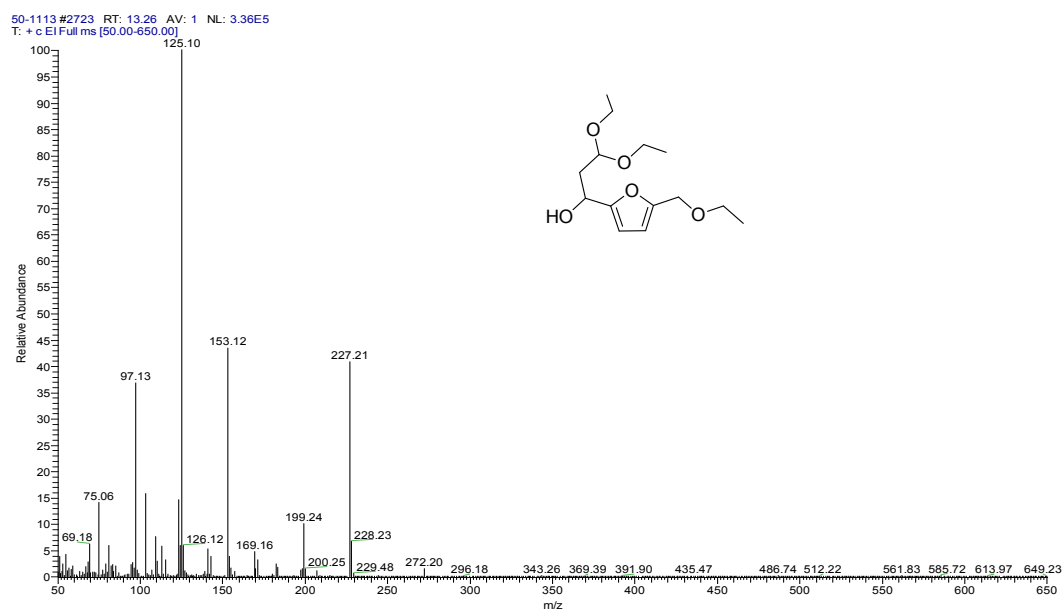


Fig. S10 MS spectrum for Compound 2

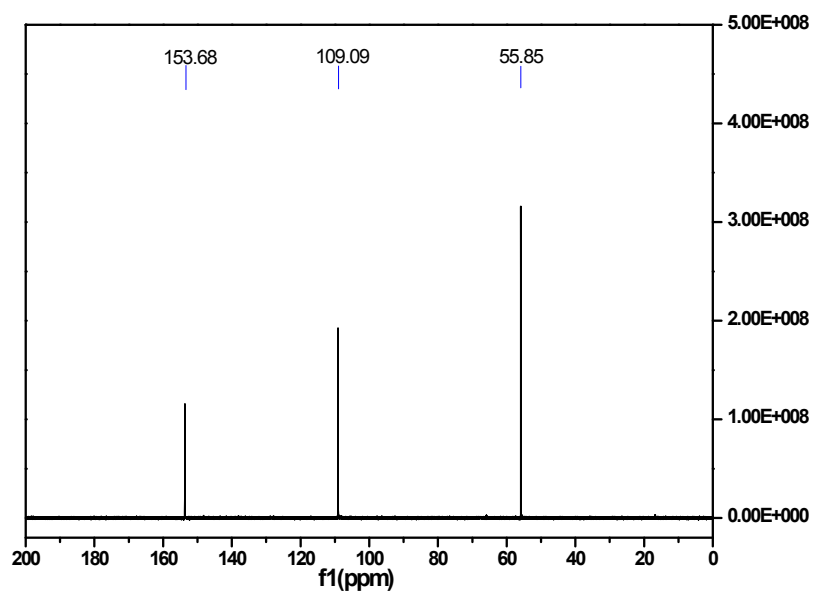


Fig. S11 ^{13}C NMR (D_2O) of purified BHMF

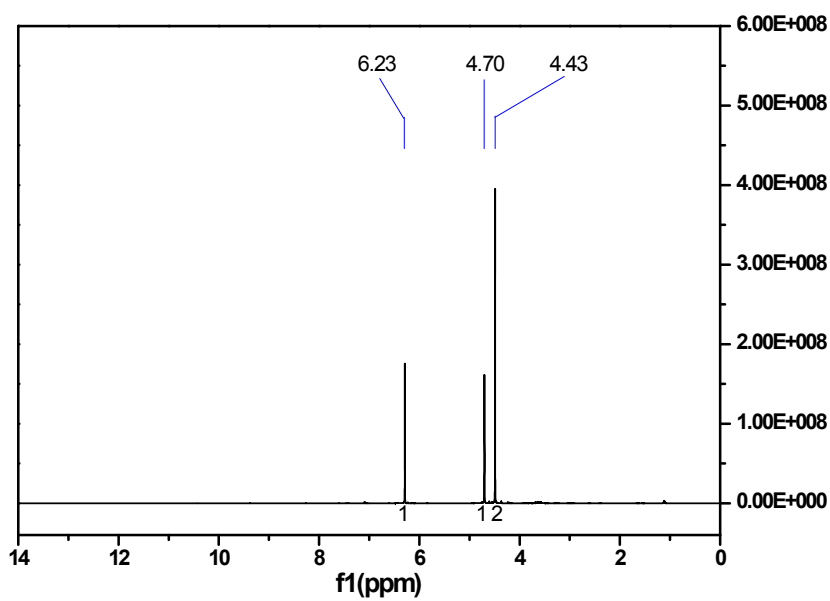


Fig. S12 ^1H NMR (D_2O) of purified BHMF

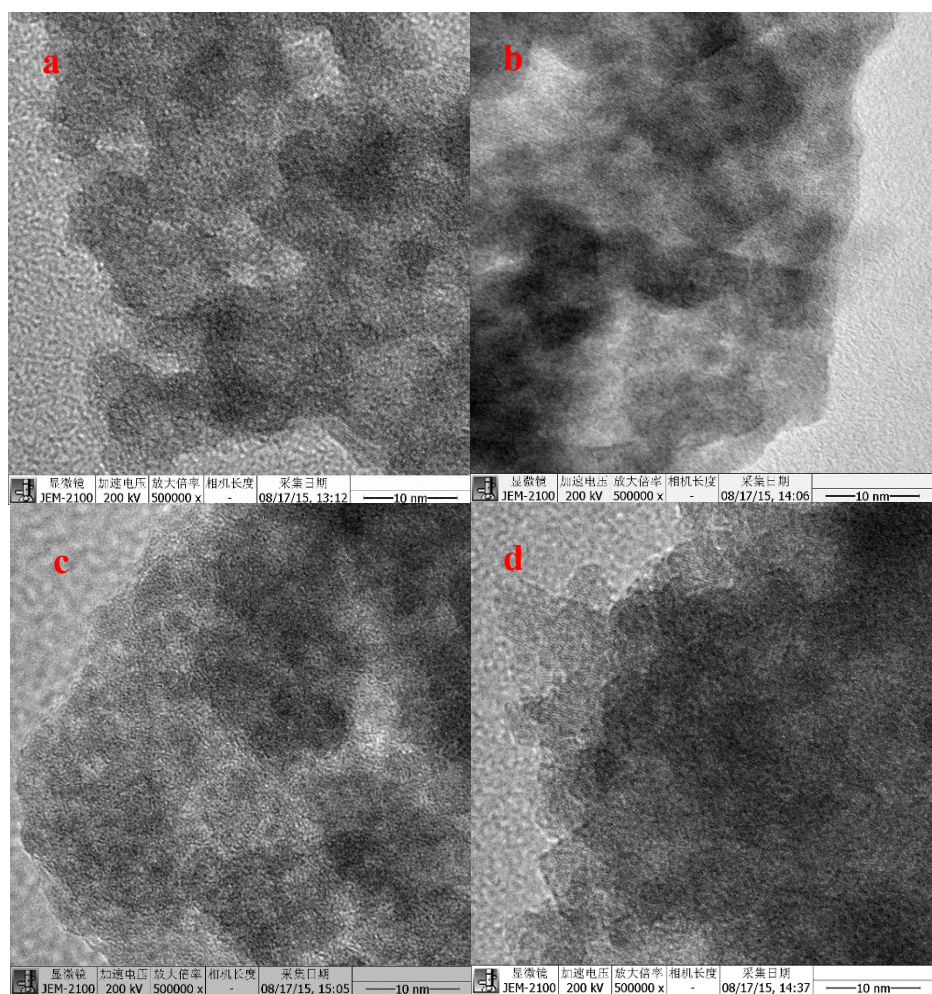


Fig. S13 TEM images for the fresh catalyst (a), the spent catalyst after the first cycle (b), the spent catalyst after the fifth cycle (c) and the regenerated catalyst by calcination at 573 K for 4 h after cycle 5 (d).

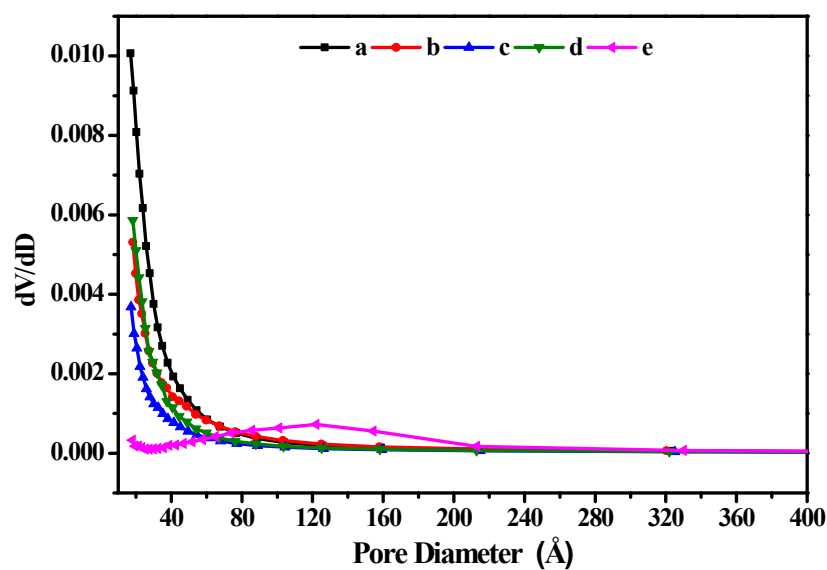


Fig. S14 Pore size distribution of the fresh catalyst (a), the spent catalyst after the first cycle (b), the spent catalyst after the fifth cycle (c), the regenerated catalyst by calcination at 573 K for 4 h after cycle 5 (d) and the ZrO₂-773 by calcination of the fresh catalyst at 773 K for 6 h (e)

Table S1 CTH of HMF into BHMF catalyzed by various metal hydroxides ^a

Entry	Catalyst	X , %	S_{BHMF} , %	S_{EMFA} , %	S_{HMFDEA} , %	S_{EMF} , %	S_{EMFDEA} , %
1	ZrO(OH) ₂	70.0	87.7	2.6	6.4	-	-
2	Al(OH) ₃	21.0	58.8	1	5.8	-	-
3	Ti(OH) ₄	28.5	18.7	8.8	72.5	-	-
4	La(OH) ₃	21.0	24.2	8.3	62.3	-	-
5	Sn(OH) ₄	52.1	-	-	12.6	41.7	17.9
6	Mg(OH) ₂	0.0	-	-	-	-	-

^a Reaction conditions: 1 g HMF, 0.5 g catalyst, 39 g ethanol, 423 K, 2h, and N₂ at atmospheric conditions.