Supplementary Information

Synergy of Wettability and Acidity in Carbon-Based Acid Catalysts for Efficient Conversion of Glucose to 5-Hydroxymethylfurfural

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Supplementary data

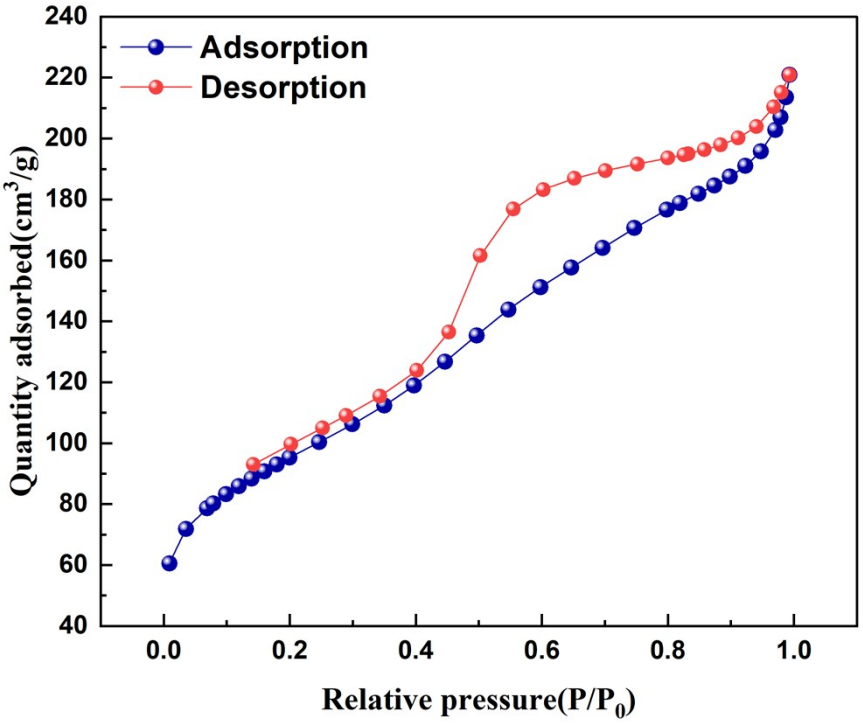

Fig. S1. Nitrogen adsorption and desorption curve of BTPC.

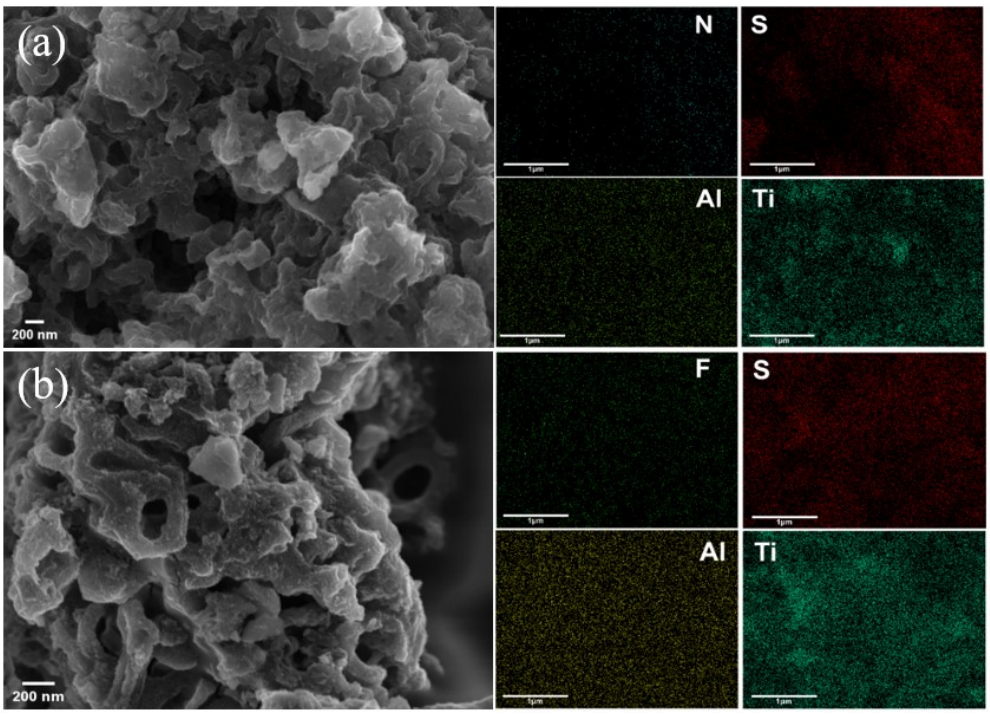

Fig. S2. (a)SEM and EDS images of Al-Ti/SBTPC-N; (b) SEM and EDS images of Al-Ti/SBTPC-F

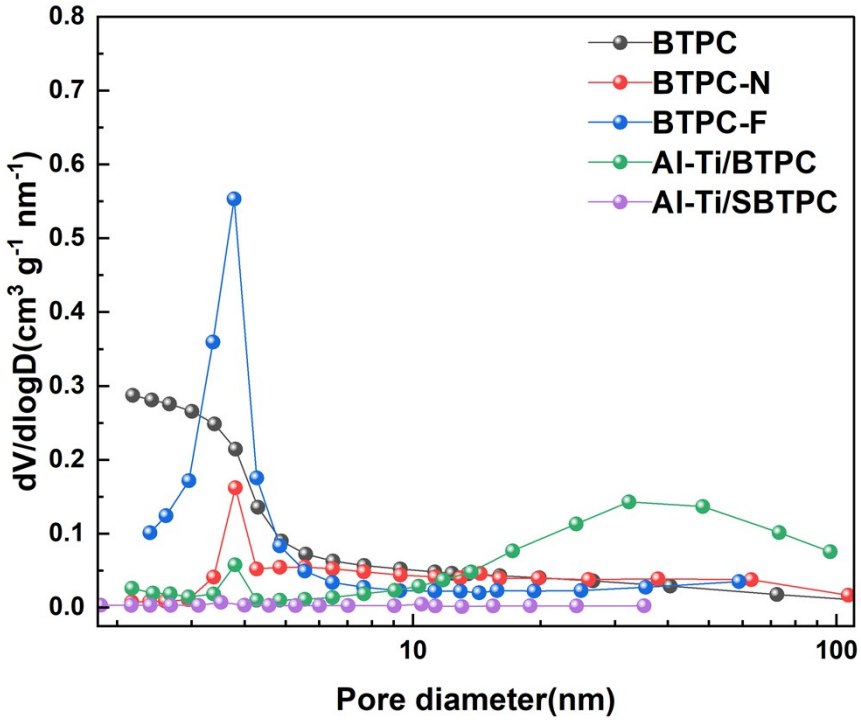

Fig. S3. Pore size distribution of BTPC, BTPC-N, BTPC-F, Al-Ti/BTPC, Al-Ti/SBTPC.

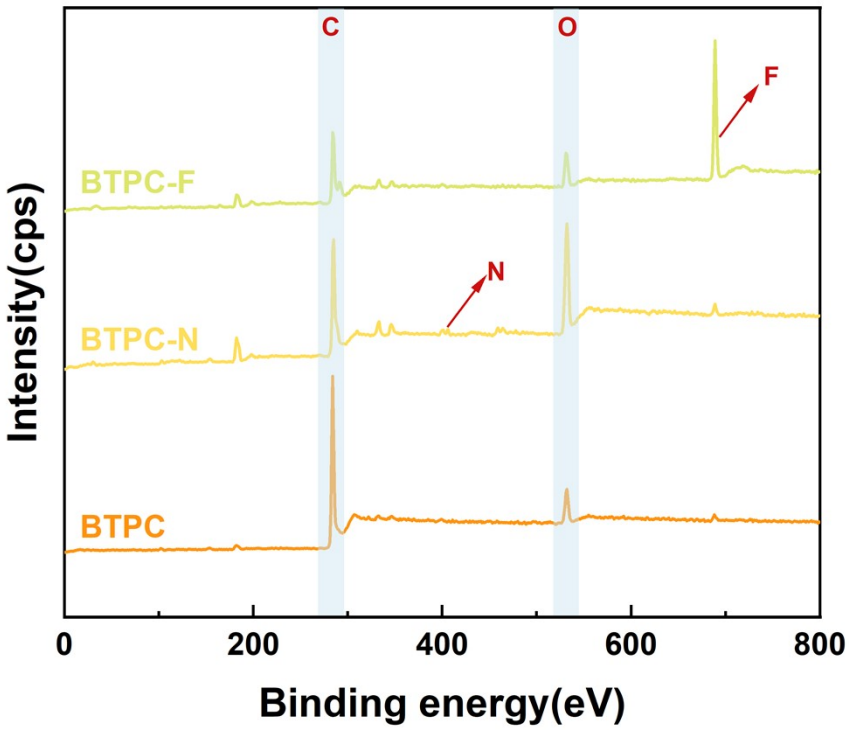

Fig. S4. XPS diagram of BTPC, BTPC-N, BTPC-F.

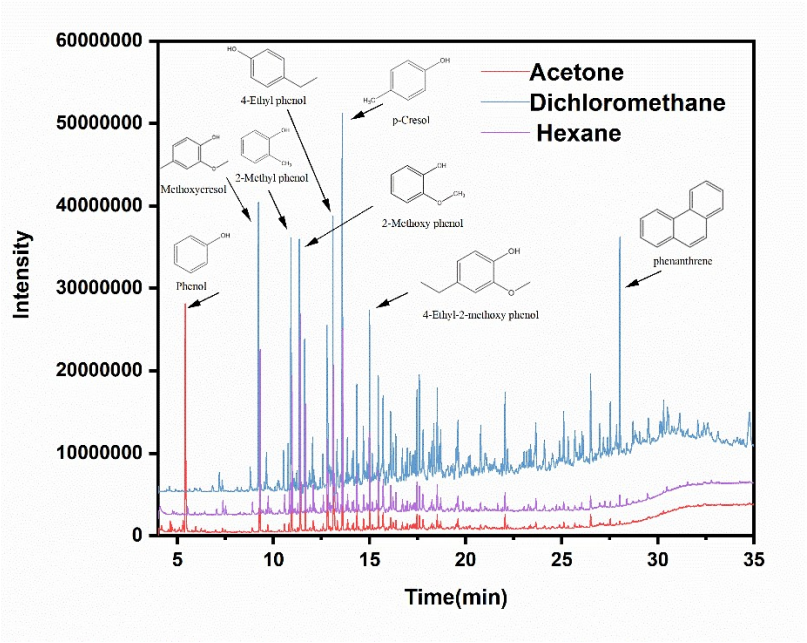

Fig. S5 Composition analysis of biomass tars. Reaction conditions. GC-FID test conditions: Nitrogen, hydrogen and air were used as carrier gases. The chromatographic column was initially heated to 80°C and ramped up to 300°C at 20°C/min and dwelled for 25min.

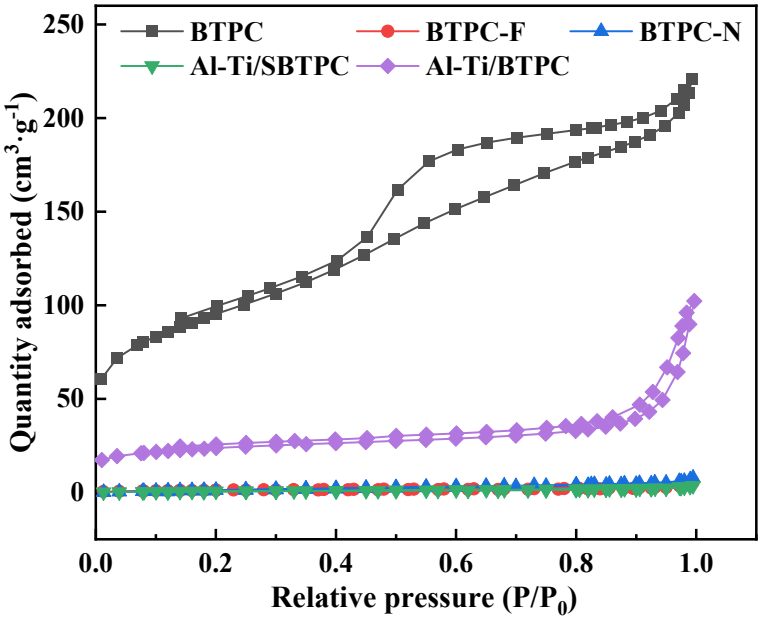

Fig. S6 Typical N_2 adsorption-desorption isotherms.

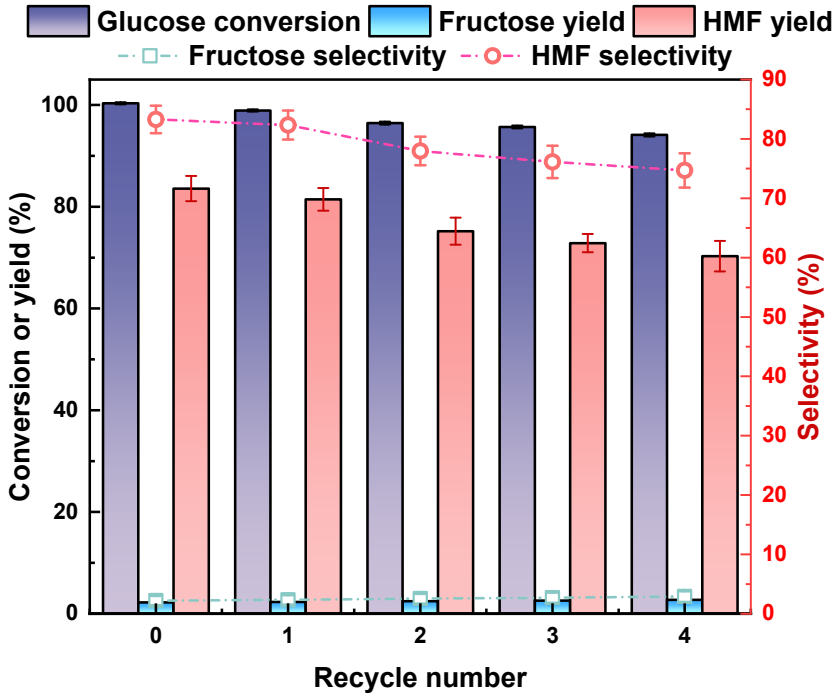

Fig. S7 Stability experiments. Reaction conditions: reaction temperature 140 C, residence time 4h.

Table S1. Specific surface area and average pore size of samples

Catalyst	BTPC	BTPC-N	BTPC-F	Al-Ti/BTPC	Al-Ti/SBTPC
BET(m^2/g)	340.1	6.9	4.43	84.2	2.9
Average pore size(nm)	4.44	5.18	6.38	17.5	5.57

Table S2 HMF production from glucose using various carbon-based solid acids.

Entry	Substrate	Catalyst	Tem. (°C)	Time (h)	Solvent	HMF yield (%)	Reference
1	Glucose	Al-Ti/SBTPC	140	4	20wt%NaCl-H_2O/DMSO	83.6	This work
2	Glucose	β-cyclodextrin-SO_3H	180	5	DMSO	47	[1]
3	Glucose	pTSa-Ca/AC	180	24	H_2O/MIBK	57	[2]
4	Glucose	PAS-CNT	160	4	H_2O/EA	42.4	[3]
5	Glucose	PCP(Cr)-SO_3H-Cr (III)	180	4	NaCl-H_2O/THF	80.4	[4]
6	Glucose	niobia/carbon	170	8	NaCl-H_2O/THF	53.3	[5]
7	Glucose	SNC	120	8	DMSO	61.3	[6]
8	Glucose	S-TsC	180	0.5	H_2O/GVL	43.8	[7]

Reference

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