

Supporting information

The reaction pathways of 5-hydroxymethylfurfural conversion in a continuous flow reactor using copper catalysts

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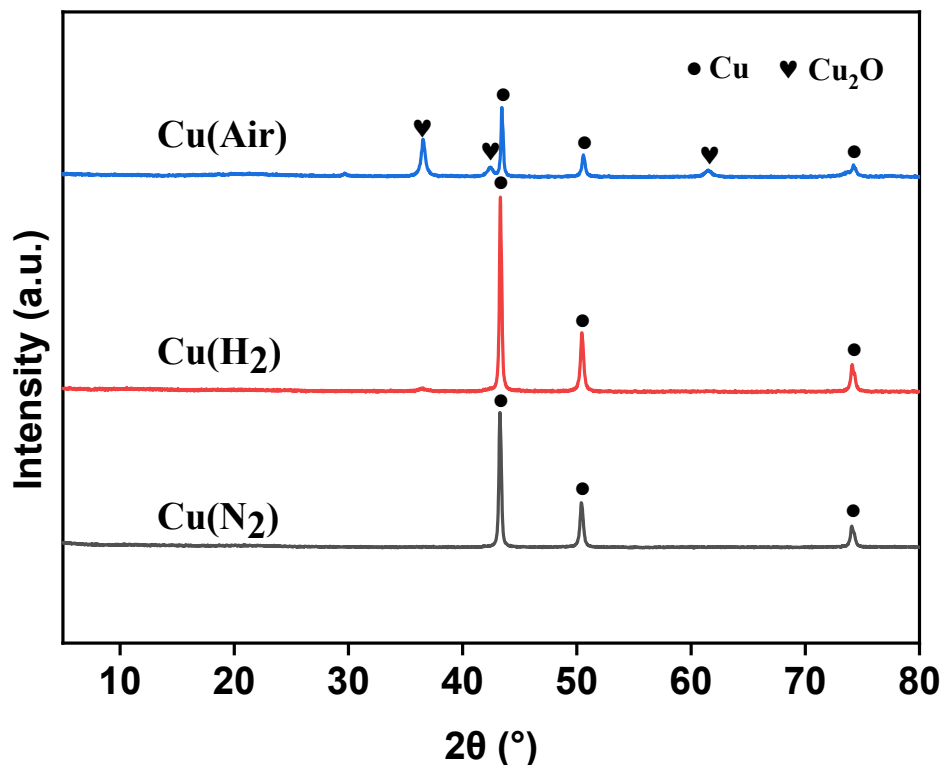


Fig. S1. Post-reaction XRD of bulk CuO catalysts after reaction in various atmospheres.

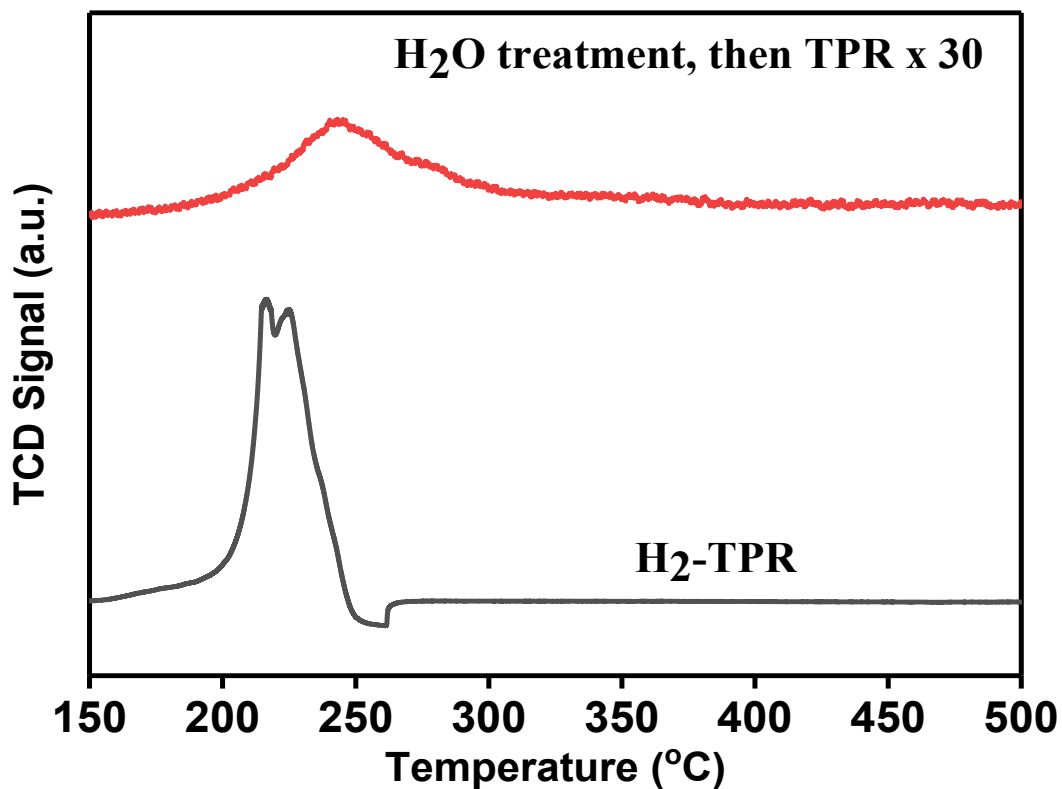


Fig. S2. H₂-TPR of bulk CuO reduced and then exposed to H₂O/He at 260 °C.

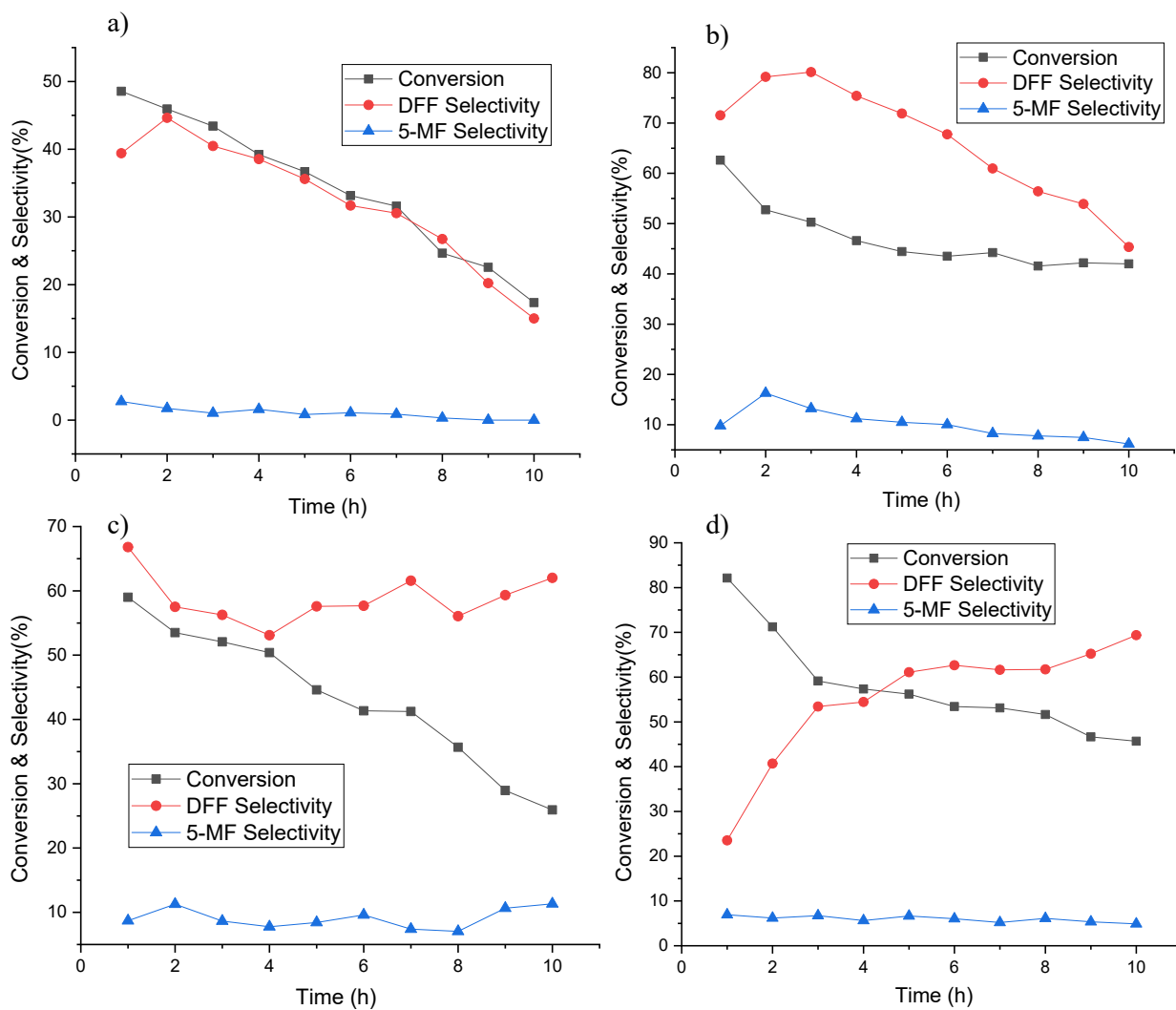


Fig. S3. Time on-stream data for a) Bulk CuO, b) Cu/Al₂O₃, c) Cu/SiO₂ and d) CuZnOAlO_x.

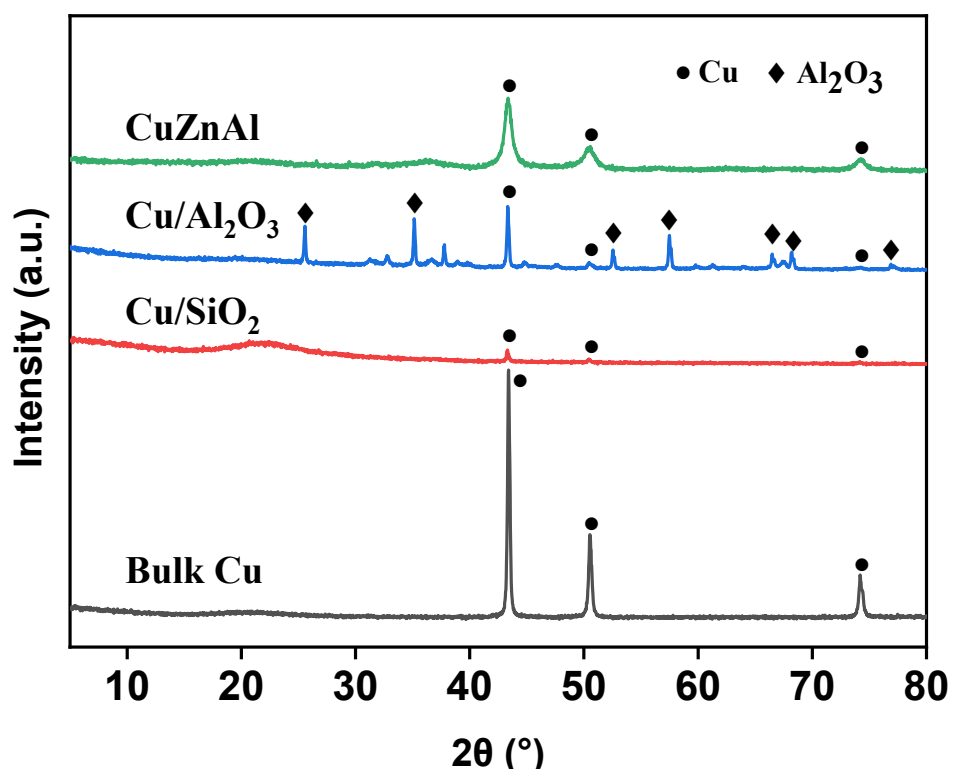


Fig. S4. Post-reaction X-ray diffraction patterns of catalysts tested for 10 h on-stream.

Table S1. Summary of catalysts reported for 5-HMF to DFF.

Catalyst	Catalyst (mg)	HMF conc. (mmol)	T (°C)	t (h)	Gas	Solvent	Conv. (%)	DFF Sel. (%)	DFF Yield (%)	STY (mmol·g ⁻¹ ·h ⁻¹)	Ref.
KMn ₈ O ₁₆ ·nH ₂ O	50	1	110	1	O ₂ 5bar	DMF	100	97	97	19.4	1
5%Mn/CoOx	50	0.5	130	4	air 1bar	DMF	80	95	76	1.9	2
VOx	100	1	130	1	O ₂ 30bar	H ₂ O	93.7	100	94	9.4	3
Ni ₃ Mn-LDH	200	1	100	4	O ₂ 10 mL/min	DMSO, 3ml	82.3	91	75	0.9	4
Ru/OMC-P _{0.56}	80	2	90	4	O ₂ 20bar	Toluene, 25 ml	100	88	88	5.5	5
Mn _{0.7} O ₂ Cu _{0.05} Al _{0.25}	50	1	90	24	O ₂ 8bar	H ₂ O, 10ml	90	87	78	0.7	6
Ru@mPMF	50	2	105	12	O ₂ 20bar	Toluene, 10 ml	99.6	85	85	2.8	7
Cu/MnO ₂	50	2	140	5	O ₂ , 3 bar	Methanol, 15 ml	75	51	38	3.1	8
Cu	200	1	260	0.75	N ₂ 10 mL/min	H ₂ O, 10 ml	42	90	38	2.5	This work
Cu/SiO ₂	200	1	260	0.75	N ₂ 10 mL/min	H ₂ O, 10 ml	53	53	28	1.8	This work
Cu/Al ₂ O ₃	200	1	260	0.75	N ₂ 10 mL/min	H ₂ O, 10 ml	48	79	38	2.5	This work
CuZnAl	200	1	260	0.75	N ₂ 10 mL/min	H ₂ O, 10 ml	68	48	33	2.2	This work

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