

Supporting Information

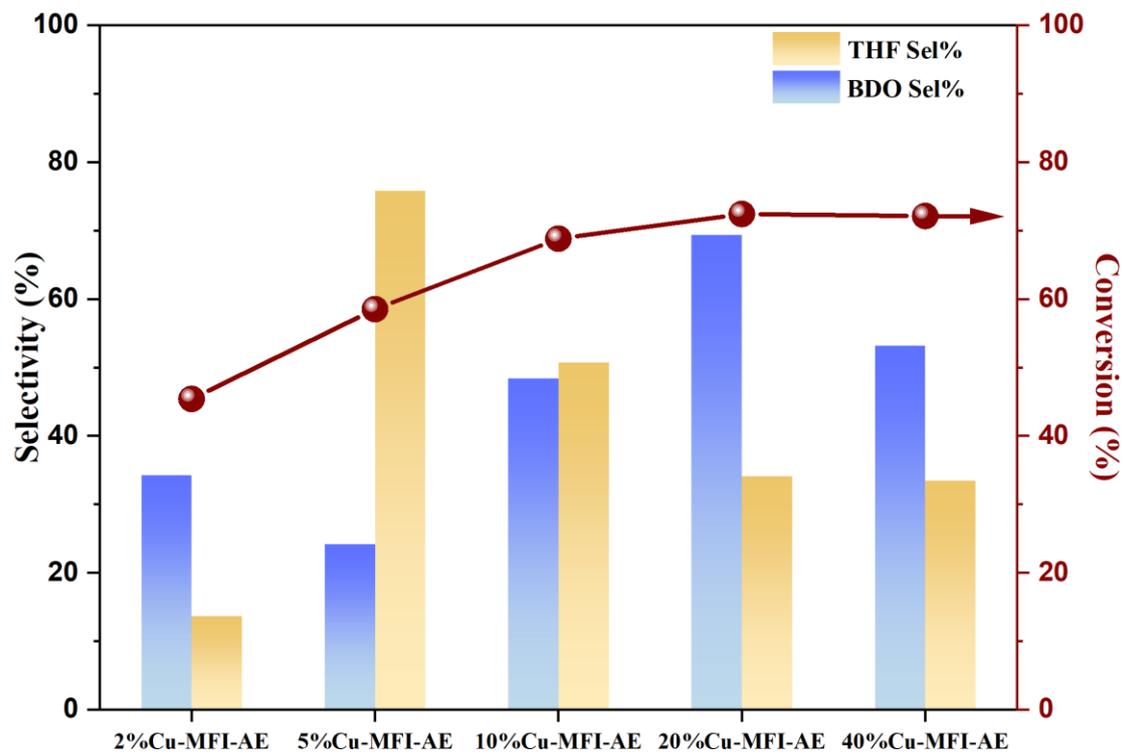


Figure S1. Catalytic performance of Cu-MFI-AE with different Cu loadings for GBL hydrogenation conversion to BDO (T=200 °C, 4MPa H₂, 8 h)

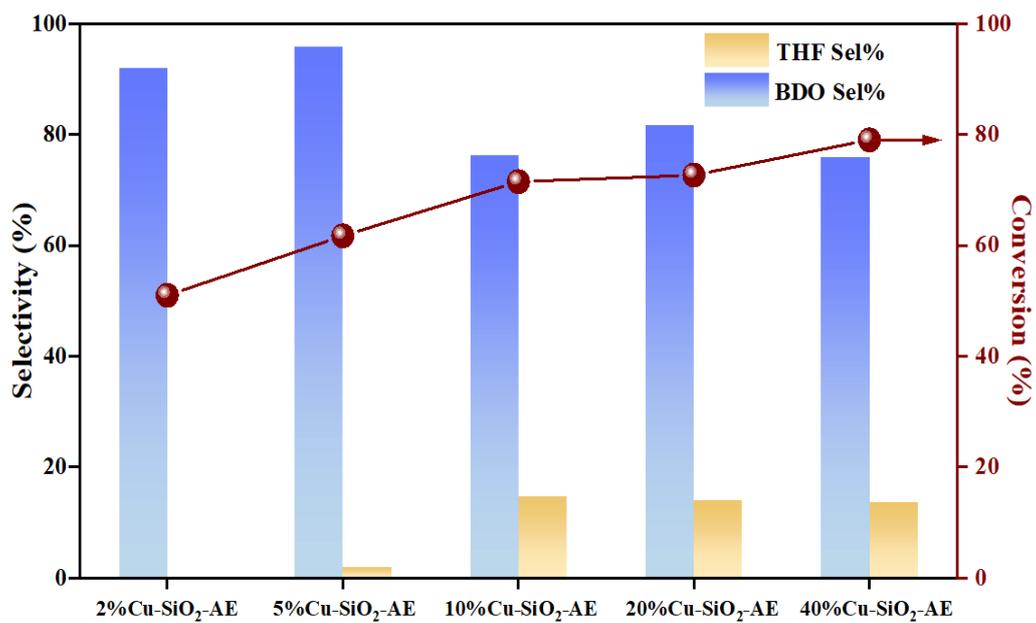


Figure S2. Catalytic performance of Cu-SiO₂-AE catalysts with different Cu loadings for GBL hydrogenation conversion to BDO (T=200 °C, 4MPa H₂, 8 h)

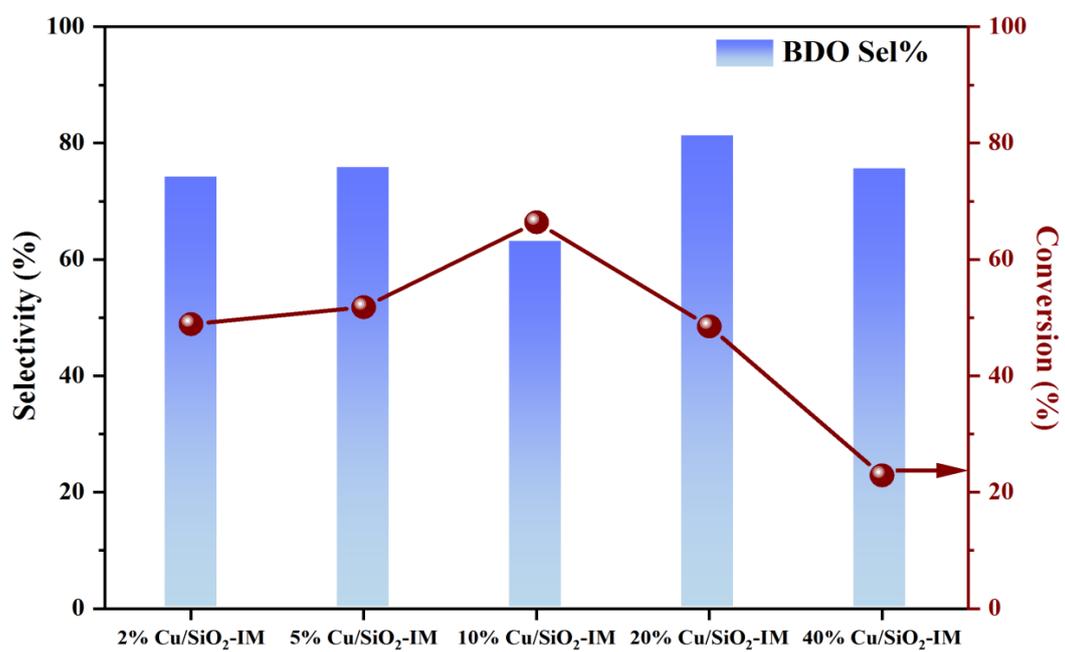


Figure S3. Catalytic performance of Cu/SiO₂-IM catalysts with different Cu loadings for GBL hydrogenation conversion to BDO (T=200 °C, 4MPa H₂, 8 h)

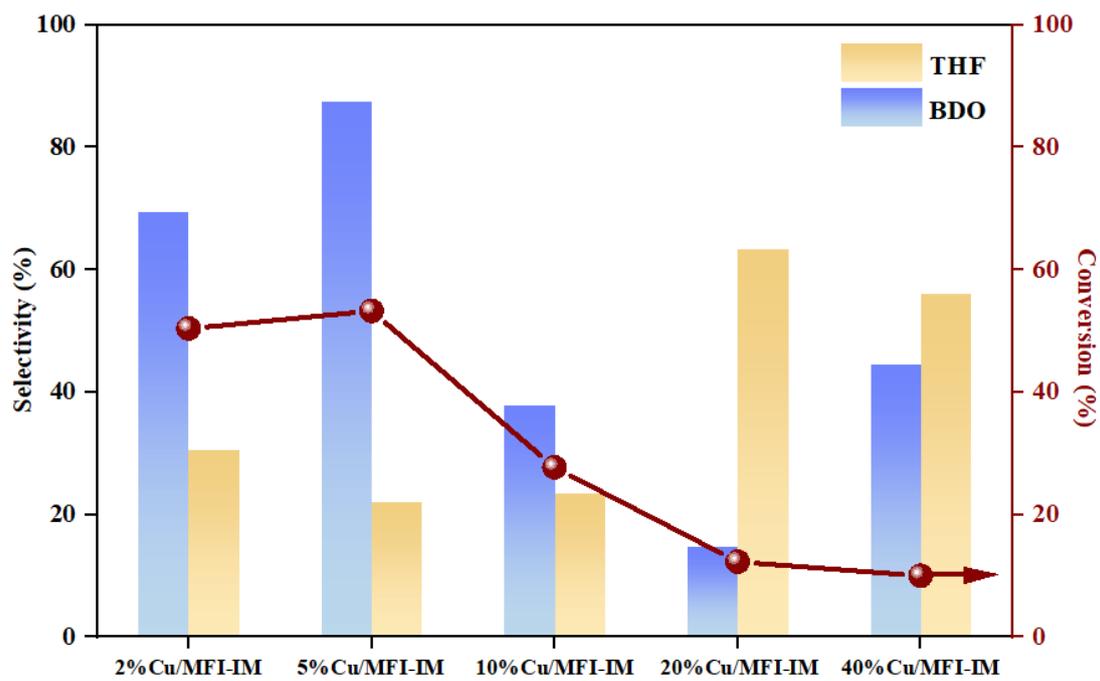


Figure S4. Catalytic performance of Cu/MFI-IM catalysts with different Cu loadings for GBL hydrogenation conversion to BDO (T=200 °C, 4MPa H₂, 8 h)

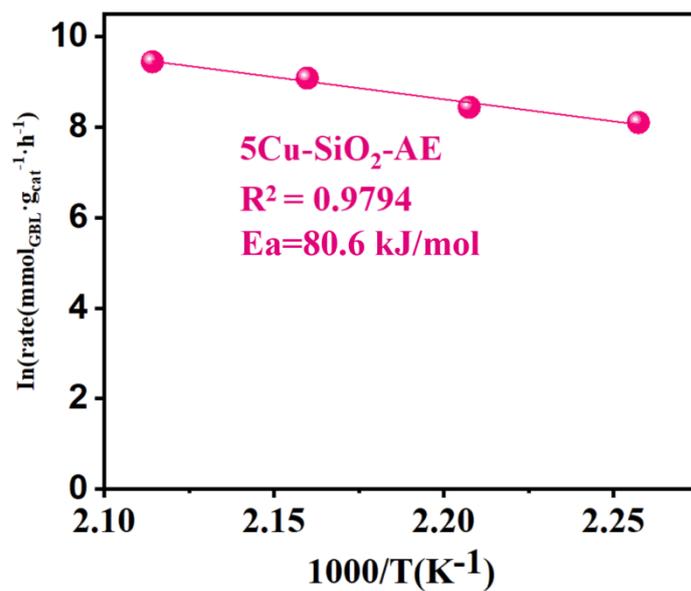


Figure S5. Arrhenius plots of GBL conversion over 5%Cu-SiO₂-AE catalysts.

The reaction conditions: GBL 1.0 g, 1,4-dioxane 19.0 mL, catalyst 0.1 g, H₂ pressure 4.0 MPa, reaction time 30 minutes.

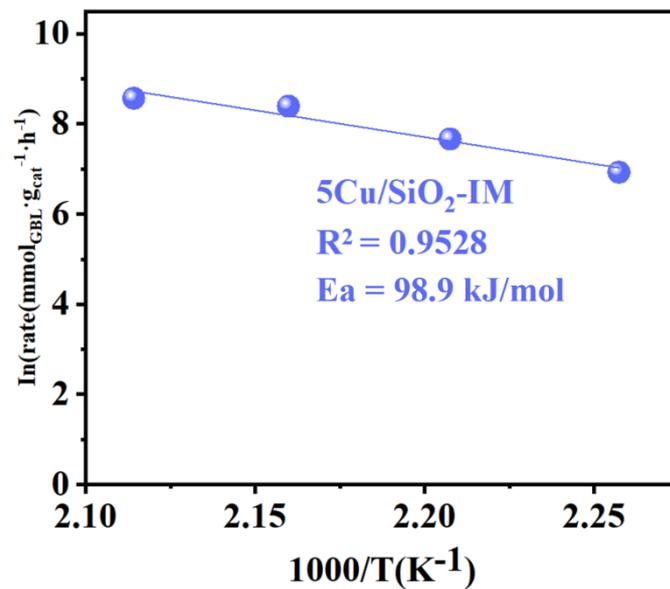


Figure S6. Arrhenius plots of GBL conversion over 5%Cu/SiO₂-IM catalysts.

The reaction conditions: GBL 1.0 g, 1,4-dioxane 19.0 mL, catalyst 0.1 g, H₂ pressure 4.0 MPa, reaction time 30 minutes.

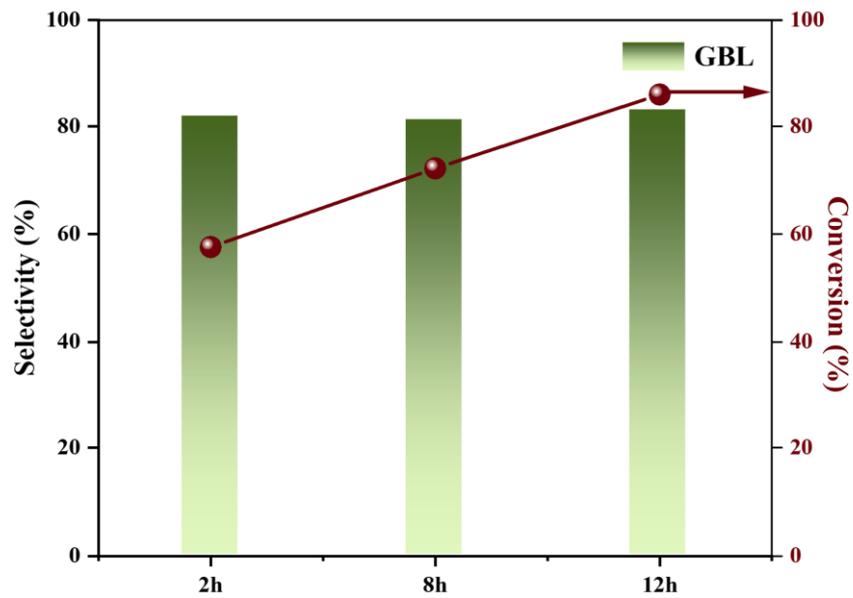


Figure S7. Catalytic performance of 5%Cu-SiO₂-AE catalyst for BDO conversion at different time (T=180 °C, 2MPa N₂)

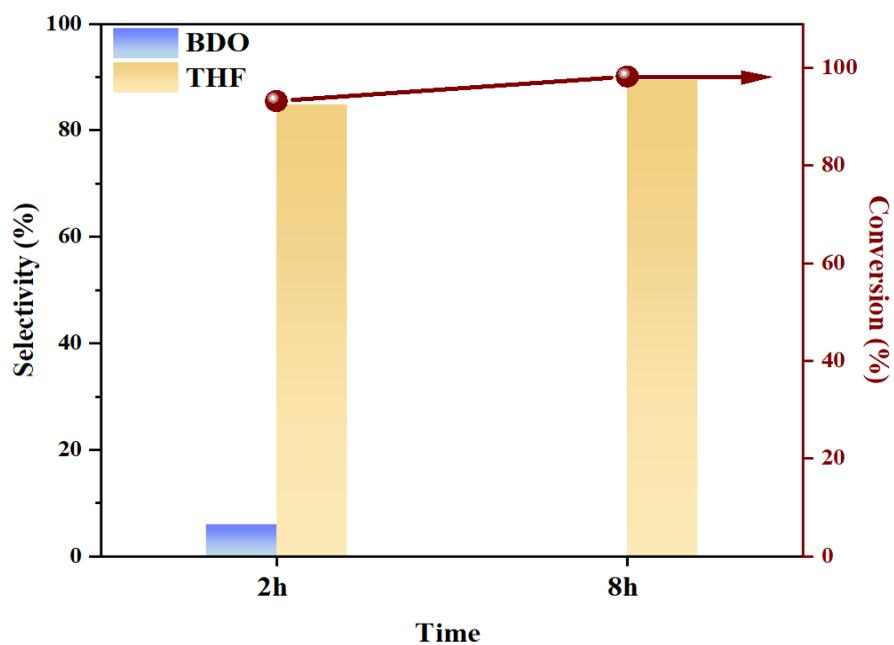


Figure S8. Catalytic performance of 5%Cu-MFI-AE catalyst for BDO conversion at different time
(T=200 °C, 4MPa H₂)

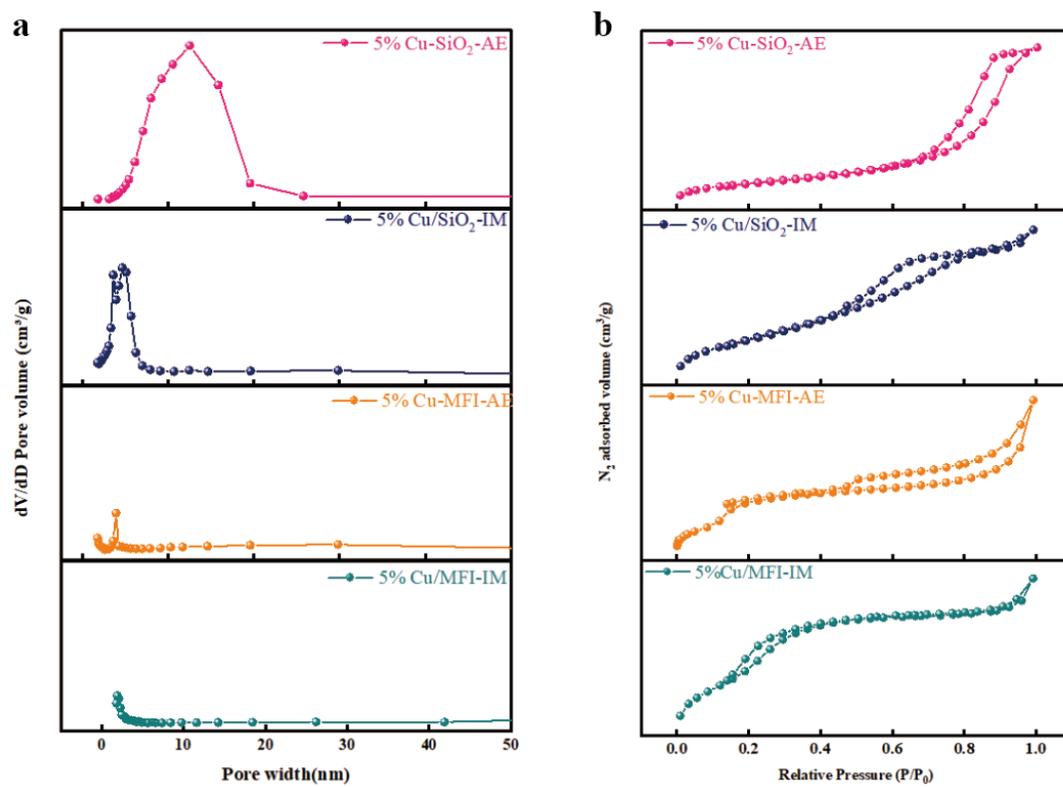


Figure S9. N_2 adsorption–desorption isotherms (a) and the corresponding pore size distributions (b) for the typical Cu catalysts.

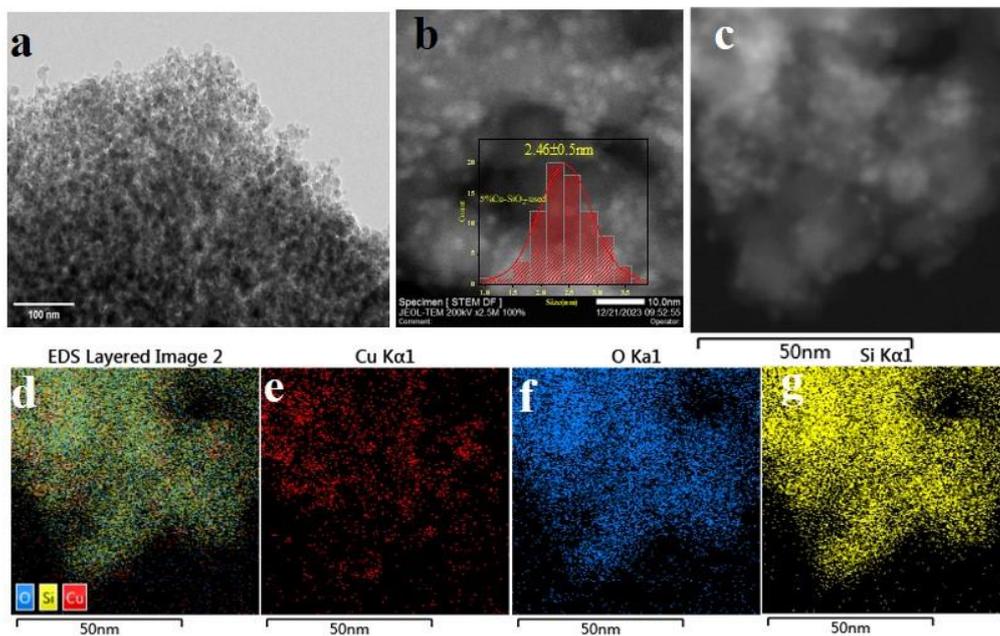


Figure S10. TEM image (a), HAADF-STEM images (b-c) and element mapping (d-g) of spent 5%Cu-SiO₂-AE catalyst.

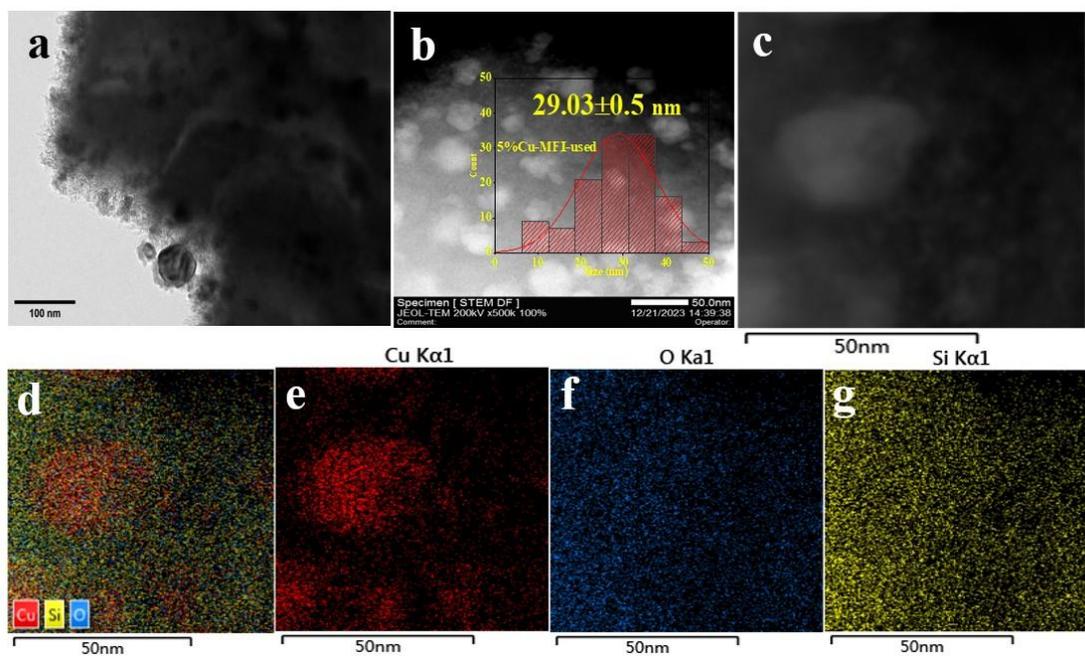


Figure S11. TEM image (a), HAADF-STEM images (b-c) and element mapping (d-g) of spent 5%Cu-MFI-AE catalyst.

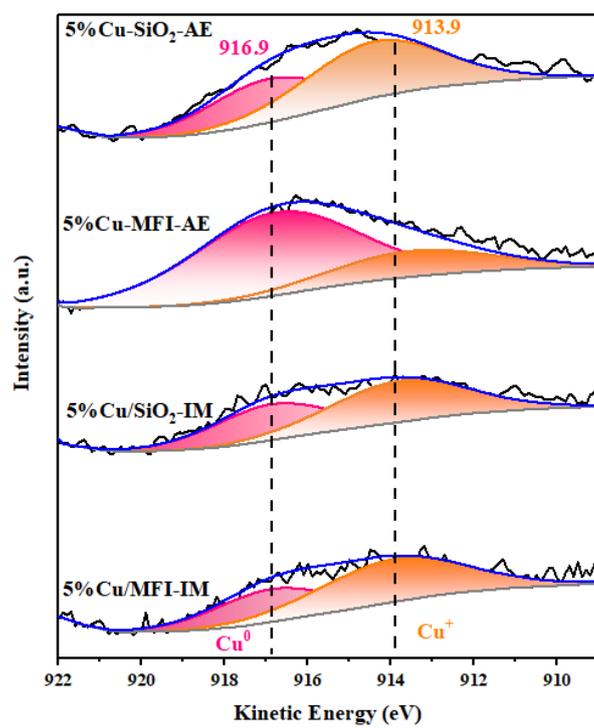


Figure S12. Cu LMM XPS spectra of the typical Cu catalysts.

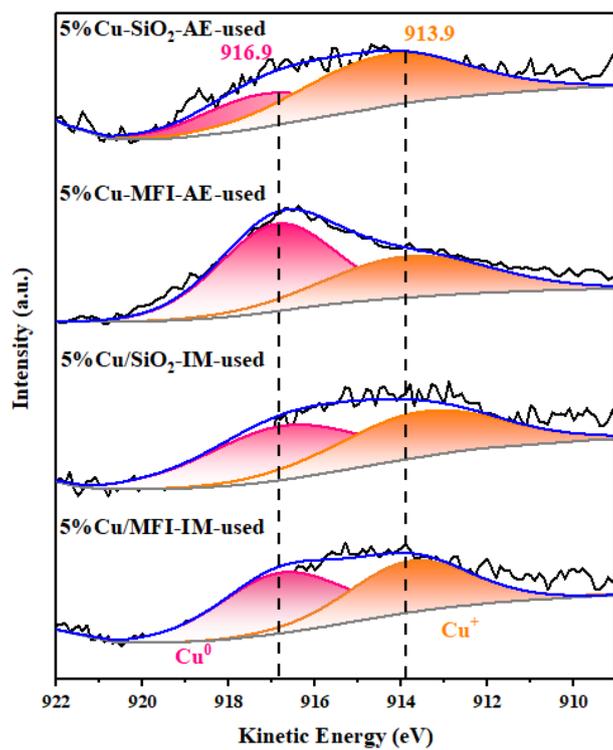


Figure S13. Cu LMM XPS spectra of the spent typical Cu catalysts.

Table S1. Catalytic performance of 5%Pd/C and 5%Ru/C. Reaction conditions: T=200 °C, 4 MPaH₂, 8 h

Entry	Catalyst	GBL Con.%	Sel.%	
			BDO Sel.%	THF Sel.%
1	5%Pd/C	0	0	0
2	5%Ru/C	5.2	44.6	12.0

Table S2. Textural properties of the typical Cu-based catalysts.

Entry	Catalyst	S _{BET} (m ² /g)	S _{micro} (m ² /g)	S _{ext} (m ² /g)	V _{micro} (cm ³ /g)	V _{meso} (cm ³ /g)	Average pore (nm)
1	5%Cu-SiO ₂ - AE	261.0	7.9	253.0	0.002	0.683	10.1
2	5%Cu/SiO ₂ - IM	375.2	0	374.7	0	0.442	4.6
3	5%Cu-MFI- AE	347.8	116.8	230.9	0.064	0.138	6.8
4	5%Cu/MFI- IM	318.3	194.3	123.9	0.100	0.063	2.7