

Supporting information

Continuous production of 1,4-pentanediol from Ethyl levulinate and industrialized Furfuryl Alcohol over Cu-based catalysts

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STEM

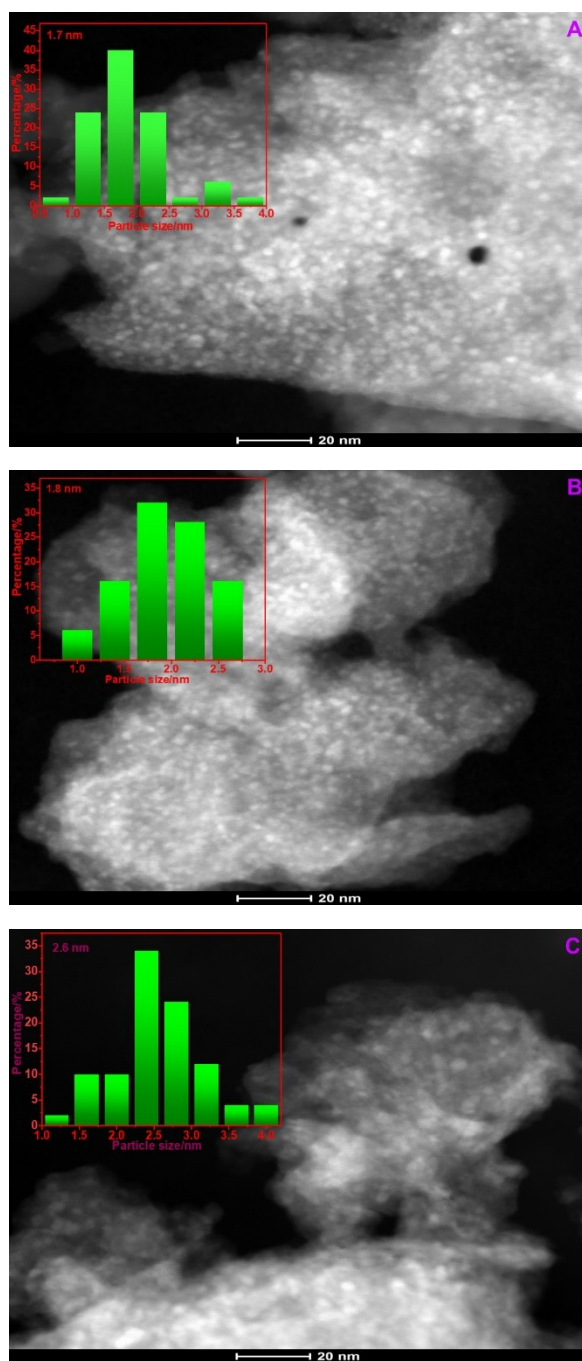


Figure S1 TEM images and particle size distributions of Cu NPs in different catalysts: (A) CuMgAl-Mix (B) CuMgAl-Na₂CO₃ (C) CuMgAl-NaOH.

STEM

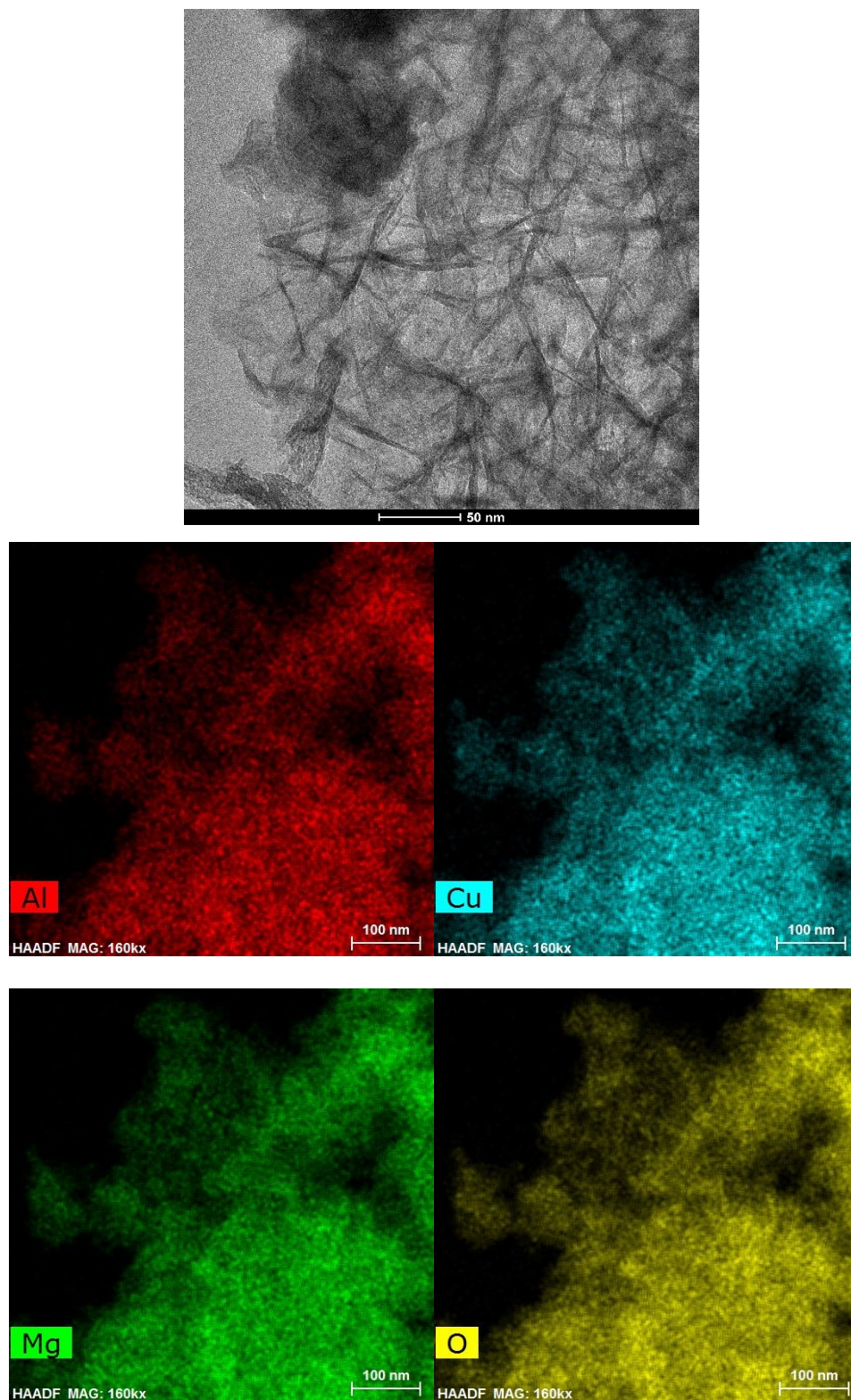


Figure S2 HAADF-STEM image of CuMgAl-Mix catalysts and the corresponding elemental maps of Cu, Mg, Al and O.

BET Analysis

Table S1 Textural properties of the samples obtained from BET analysis.

Sample	S_{BET} (m ² /g)	S_{mic} (m ² /g)	V_{tot} (cm ³ /g)	V_{mic} (cm ³ /g)
ZSM-5	350.9	307.0	0.236	0.152

S_{BET} is the specific surface area; S_{mic} and V_{mic} were calculated by t-plot method.

BET Analysis and NH₃-TPD profiles

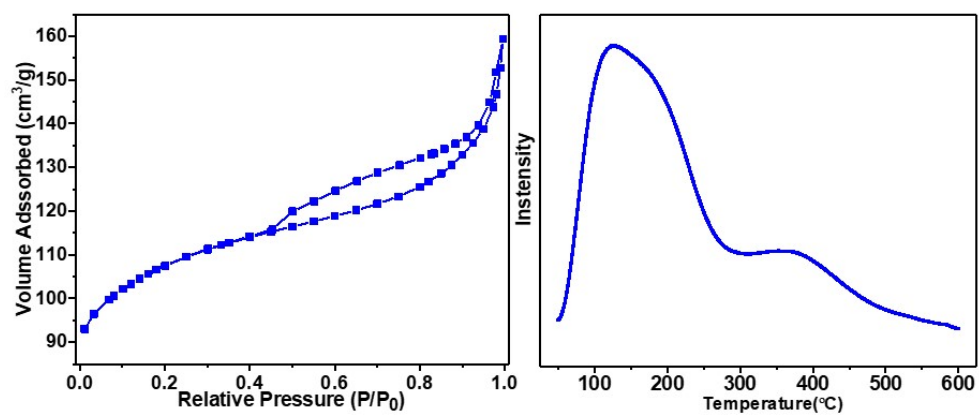


Figure S3 N₂ adsorption-desorption isotherms and NH₃-TPD curves of HZSM-5

Stability of the whole process

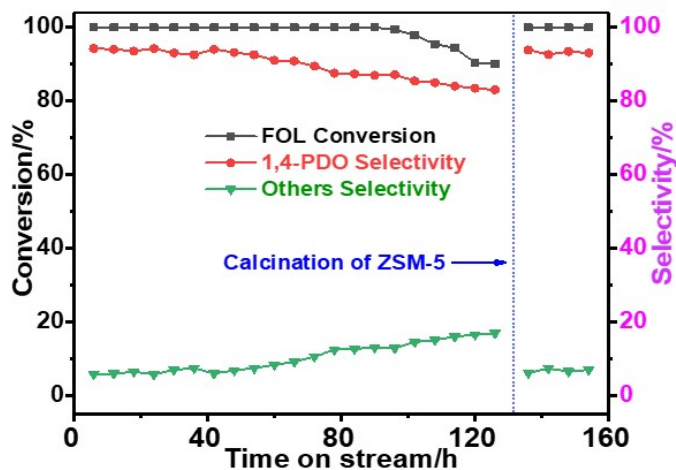


Figure S4 The stability for one-step conversion of FOL to 1,4-PDO. Reaction conditions: 4.0 g HZSM-5 + 4.0 g CuMgAl-LDH; $T_1=120$ °C; $T_2=160$ °C; 5.0 MPa; 5 wt% FOL + 95 wt% EtOH; LHSV=0.36 h⁻¹ (for FOL solution). The temperature in the upper and lower layers was adjusted by different temperature control devices, and the temperature was labeled as T_1 and T_2 respectively. Others mainly including FOL oligomers.