Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Promoting effect of Ce on Cu-Co-Al catalyst for the hydrogenolysis of glycerol to 1,2-propanediol

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This supplementary material includes:

- Table S1. Integrated areas of H_2-TPR profiles of the catalysts.
- Table S2. Catalytic results of glycerol hydrogenolysis on different solvents over 8Ce/Cu-Co-Al catalyst.
- Figure S1. Schematic diagram of the experimental apparatus.
- Figure S2. Cu 2p (A) and Co 2p (B) X-ray photoelectron spectroscopy profiles of reduced catalysts.
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Table S1 Integrated areas of H_2-TPR profiles of the catalysts.

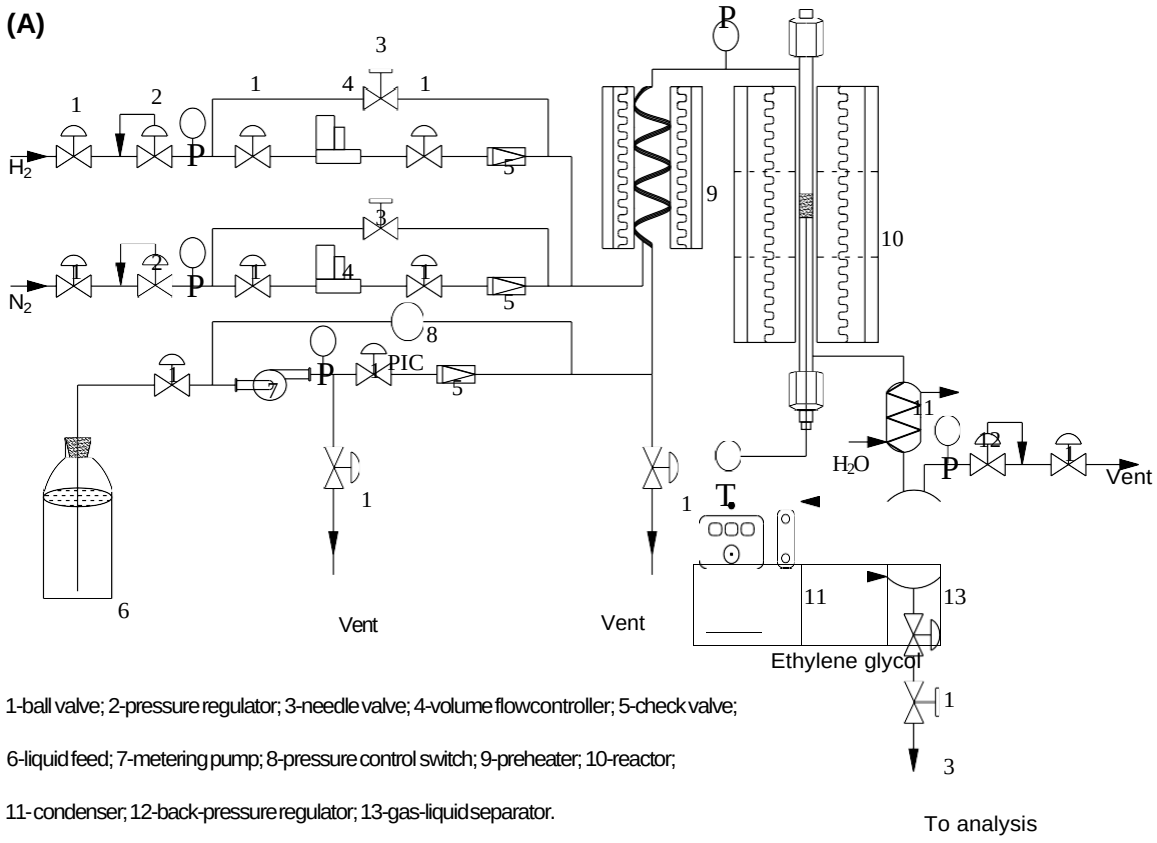
Catalyst	Integrated area		
	$\alpha + \beta$	γ	δ
Co-Al	-	8993	11768
Cu-Al	20218	-	-
Cu-Co-Al	22396	5259	15518
2Ce/Cu-Co-Al	40080	6276	22707
5Ce/Cu-Co-Al	59975	11772	29657
8Ce/Cu-Co-Al	69102	15404	31312

Table S2 Catalytic results of glycerol hydrogenolysis on different solvents over 8Ce/Cu-Co-Al catalyst[a]

Solvent	Conversion	Selectivity (%)[b]								
	(%)	1,2-PDO	Acetol	EG	MeOH	EtOH	CH_4	CO	CO_2	Others
Ethanol	91.6	92.4	0.7	1.9	0.9	-	0.6	0.2	0.1	3.2
Water	41.8	97.6	0.5	0.7	0.2	0.1	0.1	trace	0.3	0.5
Methanol	86.4	88.7	1.3	3.0	-	0.8	1.4	0.3	0.2	4.3
1-Propanol	88.3	90.1	1.1	2.4	1.7	0.5	0.8	0.3	0.2	2.9

[a] Reaction conditions: 20 wt.% glycerol concentration; liquid flow rate, 27.8 mL/h; hydrogen flow rate, 100 mL/min; catalyst loading, 4.0 g (ca. 5 mL); reaction temperature, 230 ℃; operating pressure, 3.5 MPa; data acquisition after steady operation for 3 h.

[b] 1,2-PDO = 1,2-propanediol; EG = ethylene glycol; MeOH = methanol; EtOH = ethanol; CH_4 = methane; CO = carbon monoxide; CO_2 = carbon dioxide; others include 1-propanol, 2-propanol, 1,3-propanediol, etc.



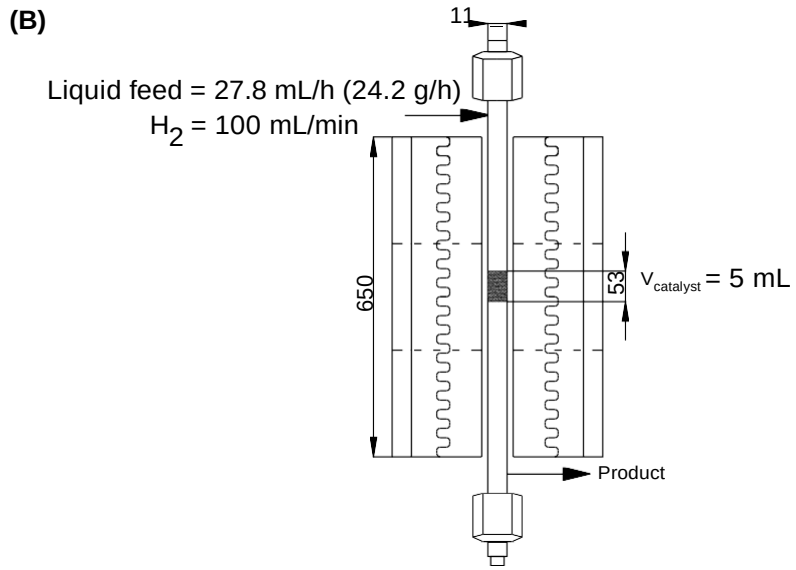


Figure S1. Schematic diagram (A) and flow diagram (C) of the experimental apparatus.

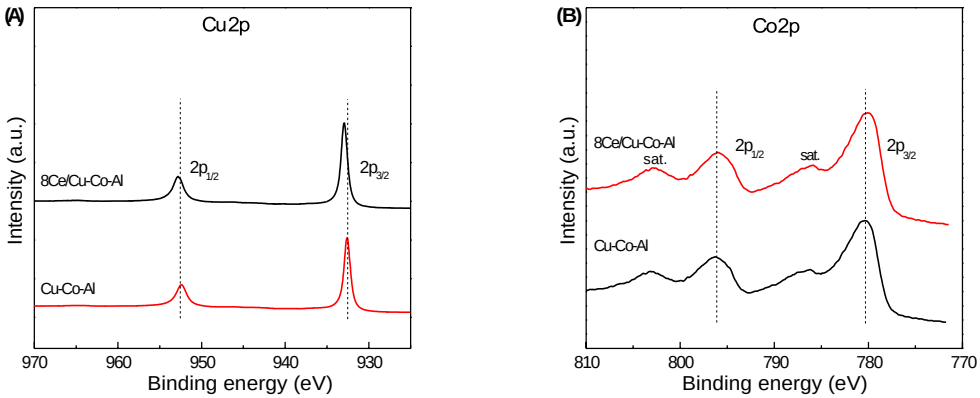


Figure S2. Cu 2p (A) and Co 2p (B) X-ray photoelectron spectroscopy profiles of reduced catalysts.

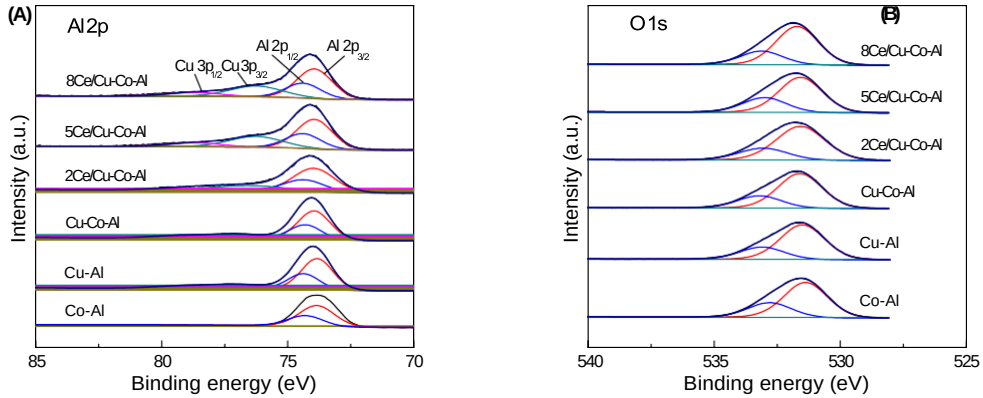


Figure S3. Al 2p (A) and O 1s (B) X-ray photoelectron spectroscopy profiles of calcined catalysts.