Supplementary Information for

Highly efficient and robust Cu/SiO_2 catalyst prepared by ammonia evaporation hydrothermal method for glycerol hydrogenolysis to 1,2-propanediol

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Table S1 Comparison for Cu/SiO_2 catalysts prepared by different preparation methods in glycerol hydrogenolysis to 1,2-PDO.

Preparation methods	Operation	T (°C)	P (MPa)	Conversion (%)	Selectivity (%)	Stability	Reference
Ion exchange	continuous	245	1.5	92	86	-	1
Impregnation	batch	240	8	10	83.6	deactivation	2
Homogeneous deposition-precipitation	batch	180	9	22.1	98.0	deactivation	3
Heterogeneous deposition-precipitation	batch	180	9	35.0	93.7	deactivation	3
Precipitation-gel	batch	180	9	73.4	94.3	200 h[a]	4
Precipitation-gel[b]	batch	200	8	73.3	92.2	deactivation[a]	5
Precipitation-gel	continuous	200	5	62.1	89.5	deactivation[c]	6
Ammonia evaporation hydrothermal method	continuous	200	5	100	98.3	300 h	this work

[a] Performed in fixed-bed reactor; solvent was 10 wt% water and 50 wt% methanol.

b Cu/SiO_2 calcined at 450 °C

c 90 wt% water as solvent.

The catalytic performances of Cu/SiO_2 catalysts with different preparation methods are summarized in Table S1. Compared to previous catalysts, the AEH method presented higher glycerol conversion and 1,2-PDO selectivity. Notably, most of the previous Cu/SiO_2 catalysts (except precipitation-gel method) deactivated rapidly due to the serious agglomeration of copper nanoparticles. The Cu/SiO_2 prepared by precipitation-gel method stabilized 200 h, while our AEH presented 300 h long-term

performance.[4] The above results indicated that AEH method was highly efficient for fabricating active, selective and robust Cu-based catalyst for glycerol hydrogenolysis to 1,2-PDO.

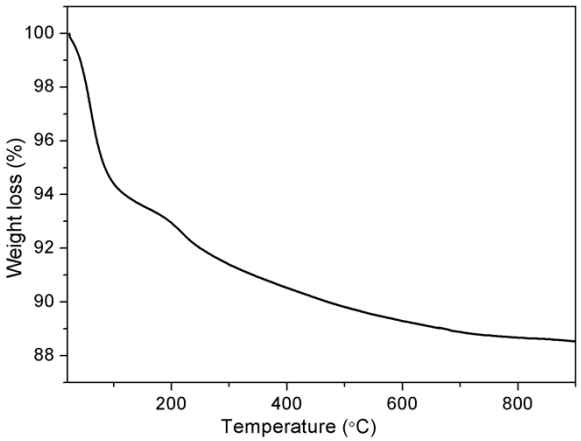

Fig. S1 Thermogravimetric analysis in oxidative atmosphere of the spent 25Cu/SiO_2-IM catalyst during long-term test.

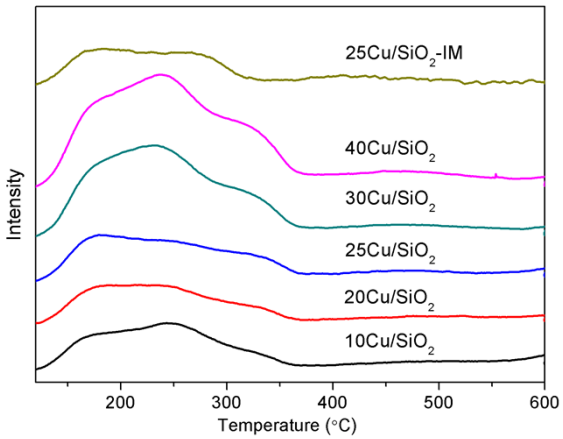

Fig. S2 NH_3-TPD profiles of various catalysts.

Reference

1 A. Bienholz, H. Hofmann, P. Claus, *Appl. Catal., A: Gen.* 2011, **391**, 153-157.

2 E. S. Vasiliadou, A. A. Lemonidou, *Appl. Catal., A: Gen.* 2011, **396**, 177-185.

3 Z. Huang, F. Cui, J. Xue, J. Zuo, J. Chen, C. Xia, *Catal. Today* 2012, **183**, 42-51.

4 Z. Huang, F. Cui, H. Kang, J. Chen, X. Zhang, C. Xia, *Chem. Mater.* 2008, **20**, 5090-5099.

5 Z. Huang, H. Liu, F. Cui, J. Zuo, J. Chen, C. Xia, *Catal. Today* 2014, **234**, 223-232.

6 S. Zhu, X. Gao, Y. Zhu, Y. Zhu, H. Zheng, Y. Li, *J. Catal.* 2013, **303**, 70-79.