Supplementary Materials

Synergetic combination of mesoporous polymeric acid and base enables heterogeneous catalytic one-pot highly efficient conversion of crude *Jatropha* oil into biodiesel

Hu Pan [a,b], Yanan Liu [b], Qineng Xia [b,*], Heng Zhang [a], Li Guo [c], Hu Li [a,*], Lingchang Jiang [b], Song Yang [a,*]

[a] State Key Laboratory Breeding Base of Green Pesticide & Agricultural Bioengineering, Key Laboratory of Green Pesticide & Agricultural Bioengineering, Ministry of Education, State-Local Joint Laboratory for Comprehensive Utilization of Biomass, Center for Research & Development of Fine Chemicals, Guizhou University, Guiyang, Guizhou 550025, China

[b] College of Biological, Chemical Science and Engineering, Jiaxing University, Jiaxing, Zhejiang 314001, China

[c] Key Laboratory of Hubei Province for Coal Conversion and New Carbon Materials, School of Chemistry and Chemical Engineering, Wuhan University of Science and Technology, Wuhan, Hubei 430081, China

Corresponding Authors:

E-mails: jhzx.msm@gmail.com (S Yang), hli13@gzu.edu.cn (H Li); xiaqineng@mail.zjxu.edu.cn (Q Xia); Tel: +86 (851) 88292171, Fax: +86 (851) 88292170.

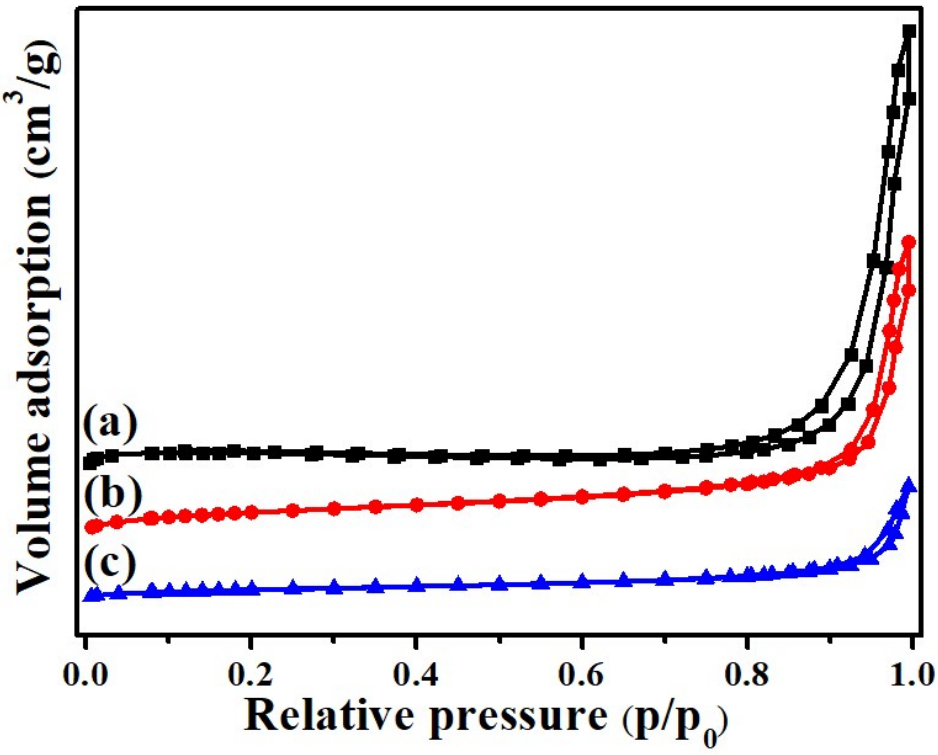

Fig. S1. N_2 physisorption isotherms of the MICP(a), MICPOH(b), and MICPHPW(c).

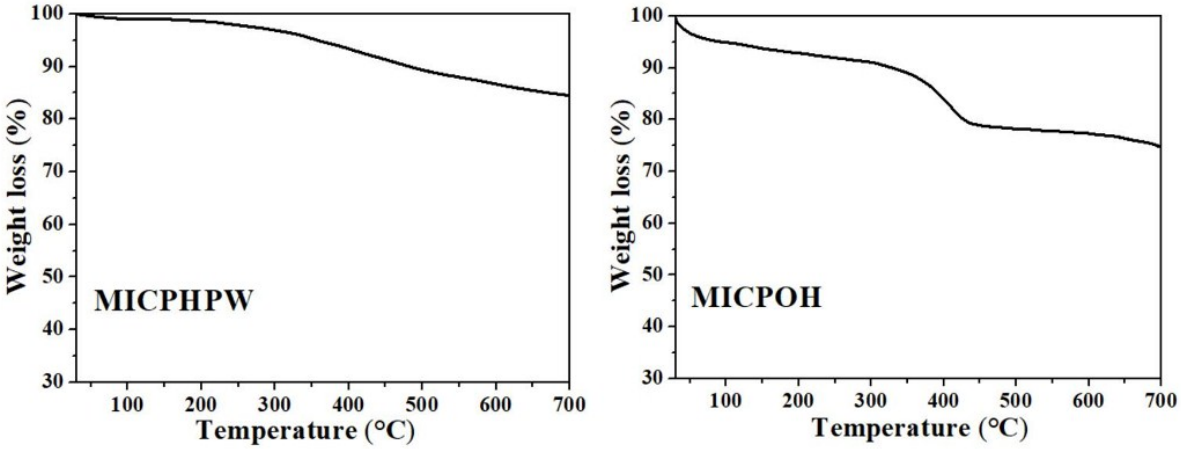

Fig. S2. TG curves of the MICPHPW and the MICPOH.

Table S1 Effect of by-product (i.e., water) of esterification on biodiesel yield.

Acid value	3	8	13	18	23
Yield	97	95	92	90	87

Table S2

The rate constants and corresponding R^2 coefficients.

Temperature (°C)	*k* (1/min)	(R^2)
60	0.0045	0.9812
70	0.0060	0.9934
80	0.0080	0.9996
90	0.0090	0.9835

Table S3

Comparison to *Ea* values of reported catalysts for transesterification.

Catalyst	Feedstock	Ea (kJ mol^{-1})	References
$Ca/Fe_3O_4@SiO_2$	Sunflower oil	47.03	[S1]
CaO	Sunflower oil	162.1	[S2]
$Cs_{2.5}PW_{12}O_{40}$	Vegetable oil	114.2	[S3]
$Fe_3O_4@Al_2O_3$	Waste cooking oil	55.5	[S4]
GCS-OH	Soybean oil	76.95	[S5]
hydrated lime-derived CaO	Palm oil	121.1	[S6]
NaOH	Soybean oil	23.7	[S7]
MICPOH	*Jatropha* oil	23.9	This work

Supporting references:

[S1] M. Feyzi, L. Norouzi, Preparation and kinetic study of magnetic Ca/Fe_3O_4@SiO_2 nanocatalysts for biodiesel production, Renew. Energy 94 (2016) 579-586.

[S2] D.J. Vujicic, D. Comic, A. Zarubica, R. Micic, G. Boskovic, Kinetics of biodiesel synthesis from sunflower oil over CaO heterogeneous catalyst, Fuel 89 (2010) 2054-2061.

[S3] H.Y. Shin, S.H. An, R. Sheikh, Y.H. Park, S.Y. Bae, Transesterification of used vegetable oils with a Cs-doped heteropolyacid catalyst in supercritical methanol, Fuel 96 (2012) 572-578.

[S4] A. Bayat, M. Baghdadi, G.N. Bidhendi, Tailored magnetic nano-alumina as an efficient catalyst for transesterification of waste cooking oil: Optimization of biodiesel production using response surface methodology, Energy Convers. Manag. 177 (2018) 395-405.

[S5] B. He, Y. Shao, M. Liang, J. Li, Y. Cheng, Biodiesel production from soybean oil by guanidinylated chitosan, Fuel 159 (2015) 33-39.

[S6] W. Roschat, T. Siritanon, B. Yoosuk, V. Promarak, Biodiesel production from palm oil using hydrated lime-derived CaO as a low-cost basic heterogeneous catalyst, Energy Convers. Manag. 108 (2016) 459-467.

[S7] L. Wu, K. Huang, T. Wei, Z. Lin, Y. Zou, Z. Tong, Process intensification of NaOH-catalyzed transesterification for biodiesel production by the use of bentonite and co-solvent (diethyl ether), Fuel 186 (2016) 597-604.