

Title:Guerbet Reactions for Biofuel Production from ABE fermentation Using Bifunctional Ni-MgO-Al₂O₃ Catalysts

Authors: Zhiyi Wu, Pingzhou wang, Jie Wang and Tianwei Tan*

Beijing Key Laboratory of Bioprocess, National Energy R&D Center for Biorefinery, College of Life Science and Technology, Beijing University of Chemical Technology, No. 15 of North Three-ring East Road, Chaoyang District, Beijing 100029, PR China

Author Information

Corresponding Authors

Tel: 86-010-64434819 (Tan, T. W.)

Email address: twtan@mail.buct.edu.cn (Tan, T. W.)

Contact address: College of Life Science and Technology, Beijing University of Chemical Technology, No. 15 of North Three-ring East Road, Chaoyang District, Beijing 100029, PR China

Supporting Information

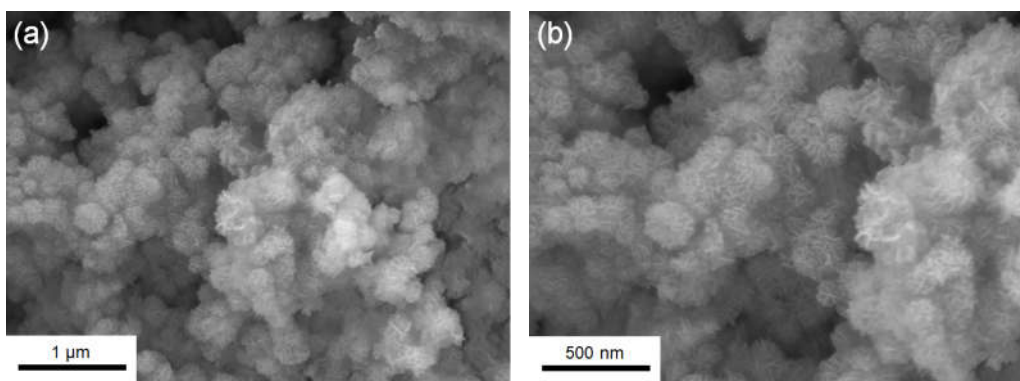


Fig. S1. (a) and (b): SEM images of Ni-MgO-Al₂O₃ catalyst (Mg/Al=3).

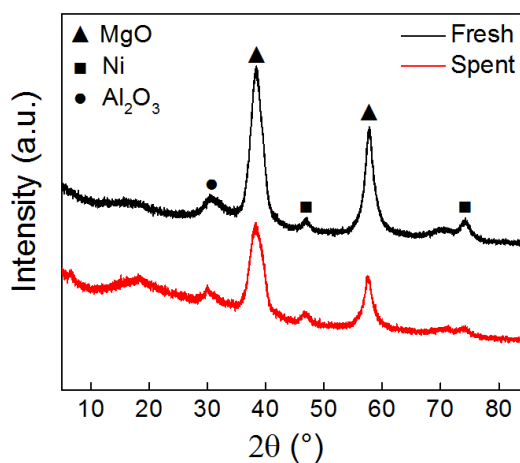


Fig. S2. XRD patterns of Ni-MgO-Al₂O₃ (Mg/Al=3, Ni content = 6 wt.%) catalysts before and after reactions.

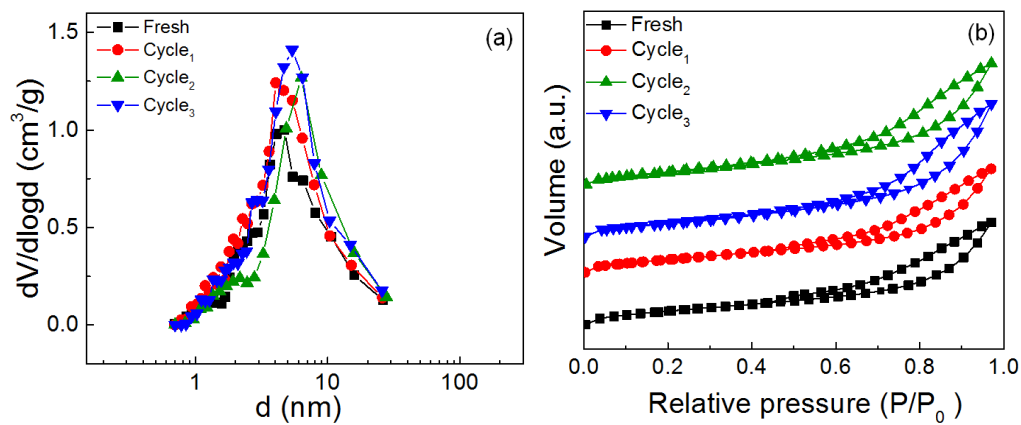


Fig. S3. (a) Pore size distributions and (b) N₂ adsorption/desorption isotherms of fresh and spent

catalysts.

Table S1. BET results of Ni–MgO–Al₂O₃ catalysts (Ni content = 6 wt.%) before and after reactions.

Sample	Surface area (m ² /g)	Pore volume (cm ³ /g)	Mean pore size (nm)
Fresh	237.5	0.68	5.7
Cycle ₁	234.4	0.66	5.6
Cycle ₂	229.4	0.65	5.6
Cycle ₃	222.5	0.64	5.5

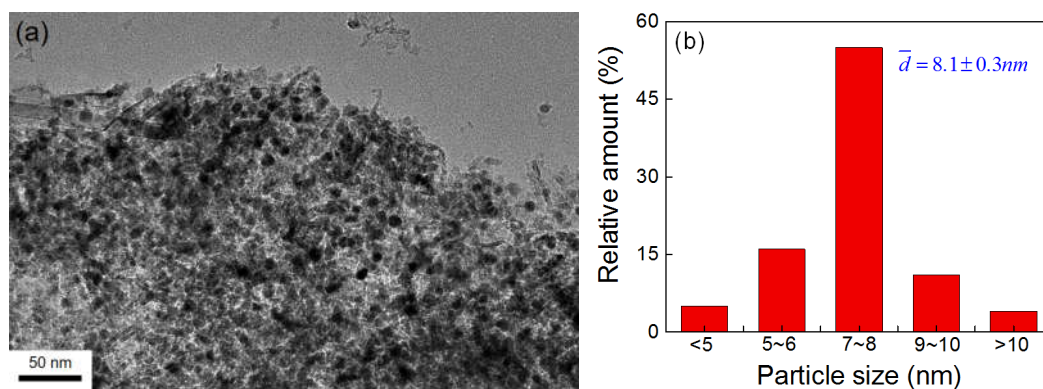


Fig. S4. (a) TEM image of spent catalyst Ni–MgO–Al₂O₃ (Mg/Al=3) catalysts. (b) Histogram of particle size distribution of Ni nanoparticles.

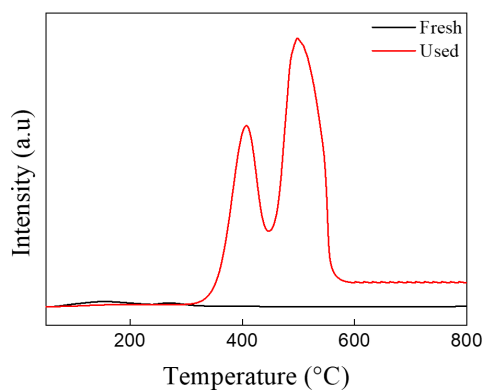


Figure S5. CO₂-TPD profiles of the fresh, used Ni–MgO–Al₂O₃ catalysts.

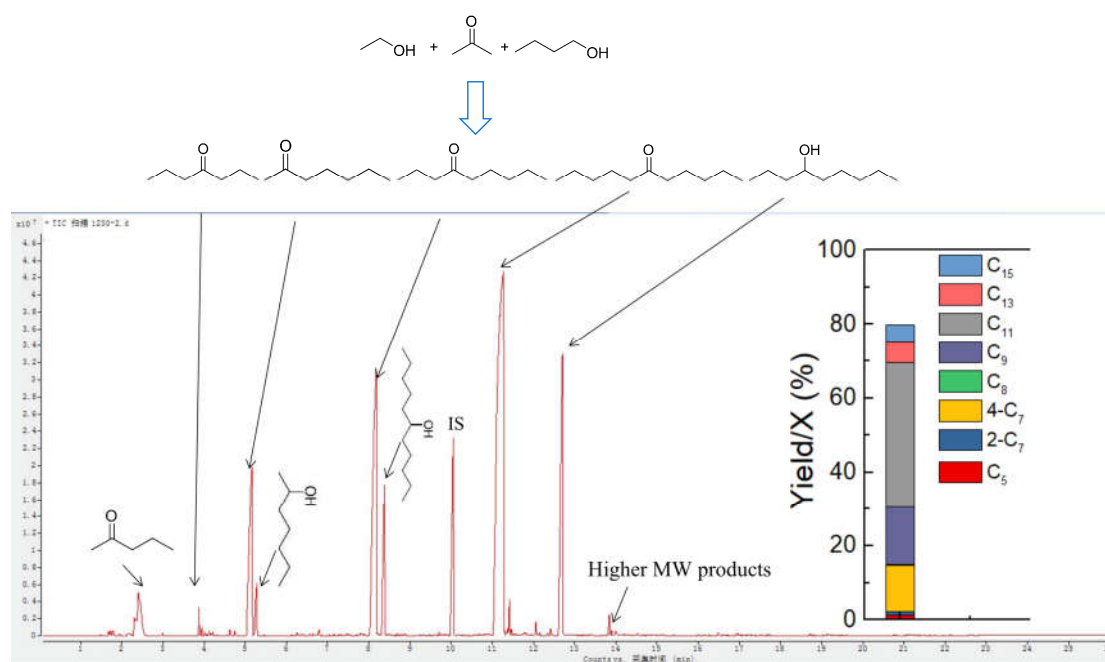


Figure S6. Results of the catalytic coupling of ABE mixture. Reaction conditions: 1.5g cat: Ni-MgO-Al₂O₃, 240°C for 20 hours. Values determined by FID, using internal standard.