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Supporting information

Selective Oxidation of Styrene by H_2O_2 over Novel Supported Palladium(II)-based catalysts

Yuchan Han [1], Li Wu [1], Qi Han [1], Rongfan Zhang [1], Jun Li [1]*

[1] School of Chemical and Environmental Engineering, Shanghai Institute of Technology, Shanghai 201418, China

* Corresponding author. E-mail address: lij05@sit.edu.cn (J. Li).

1. Synthesis of SBA-15

The synthesis of SBA-15 has been achieved using known procedure reported by Zhao D Y and co-workers with minor revision[1]. In a 500 mL three-necked fask, 4 g P123 and 120 g 2 mol/L hydrochloric acid were dissolved in 30 g deionized water, stirring in a 38 °C water bath for 2 h. Then 8.4 g tetraethyl orthosilicate was dripped into the solution with stirring at 38 °C for 24 h. The white emulsion was transferred to a Tefon-lined autoclave. The autoclave was then sealed and heated to 100 °C for 36 h in oven. After the reaction, the mixture in the autoclave was cooled to room temperature. The solid was fltered of and washed with deionized water and absolute ethanol, and dried at 120 °C for 12 h, the obtained solid was calcined at 550 °C for 6 h to obtain SBA-15.

2. Synthesis of GO

Graphene oxide (GO) was prepared from graphite powder by a modified Hummer's method in our group [2].

3. Synthesis of bis-imine ligands (B)

Take a 250 mL round bottom flask with a condensation circulation device, weigh 1.073g (8 mmol)of isophthalaldehyde and 3.75 mL (16 mmol) of 3-aminopropyltriethoxysilane, and dissolve them in 100 mL of absolute ethanol. Under the protection of nitrogen, condensate and reflux at 70 ℃ for 12 hours. After the reaction, ethanol was dried by vacuum distillation and vacuum drying for 12 h to obtain bis-imine ligands (B) . ^{1}H-NMR ($CDCl_3$，δ ppm)：8.23 (s, 2H), 7.97 (s, 1H), 7.72 (d, 2H), 7.37 (t, 1H), 3.75 (q, 12H), 3.56 (t, 4H), 1.77 (m, 4H), 1.16 (m, 18H), 0.61 (t, 4H); ^{13}C-NMR ($CDCl_3$，δ ppm)：160.17, 136.61, 129.61, 128.60, 127.76, 64.01, 58.11, 24.10, 18.12, 7.89.

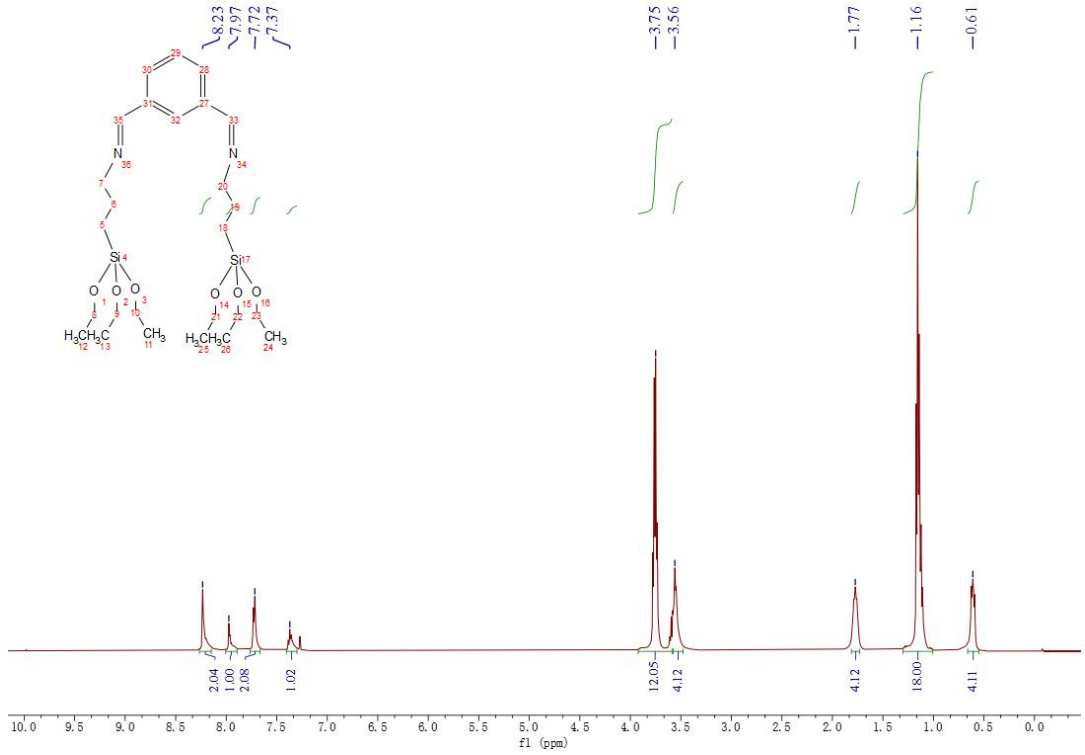

Fig. A1 ^{1}H-NMR spectra of diimine ligand B

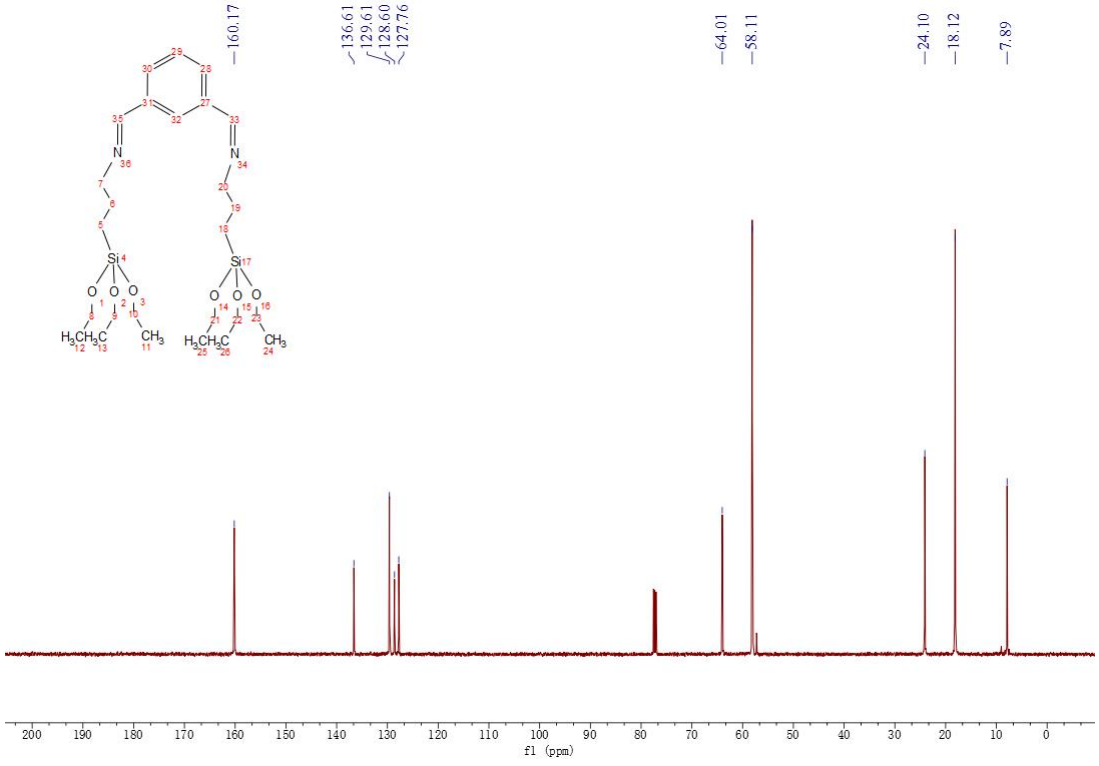

Fig. A2 ^{13}C-NMR spectra of diimine ligand B

4. SEM Characterization

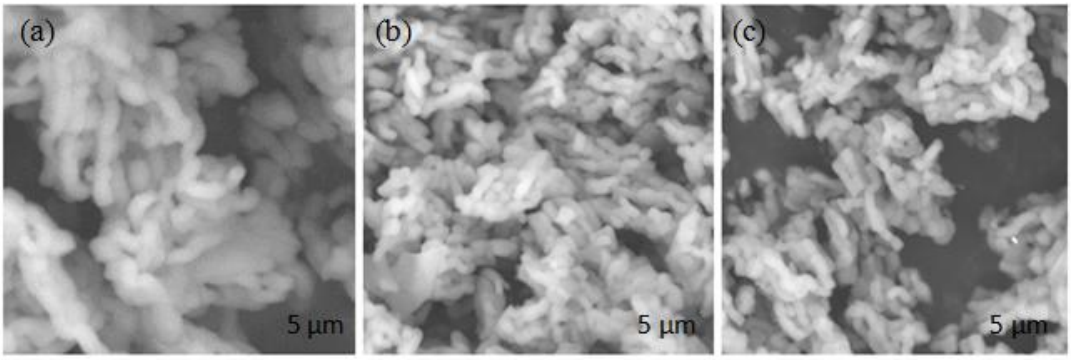

Fig. 2 SEM of SBA-15, SBA-15-B and SBA-15-B-Pd

The SEM images of SBA-15, SBA-15-B and SBA-15-B-Pd(II) are presented in Fig.2. No much difference was found with the above image. All the samples display good long rice-grain morphology, demonstrating high stability of the SBA-15 mesoporous structure. The modification of the ligand and the loading of metal palladium did not change the morphology of the mesoporous material.

5. N_2 Adsorption/Desorption Characterization

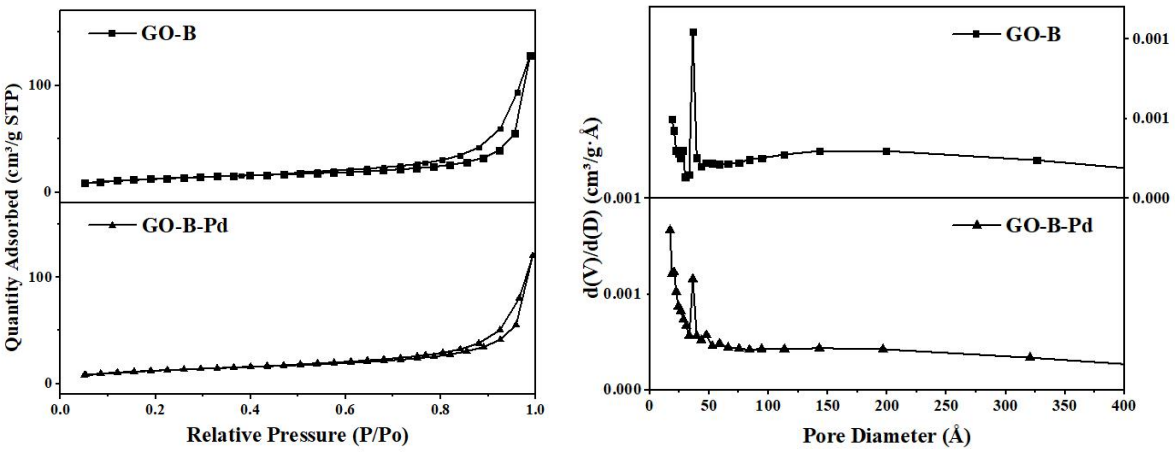

Fig. 3 N_2 adsorption/desorption curves and pore size distribution curves of GO-B and GO-B-Pd

References

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[2] J. Gao, S. Zhang, X. Zhang, C. Yu, H. Ye, Y. Qian and H. Song, RSC Adv., 2012,5, 3954–3958.