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Supplementary Information for

New porous Zr-containing catalyst with phenate group: efficient catalyst for catalytic transfer hydrogenation of ethyl levulinate to γ-valerolactone

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1. **Table S1**. Physical properties of Zr-BDC and Zr-HBA.

Sample[a]	BET surface area (m^2g^{-1})[b]	Pore volume (cm^3g^{-1})[c]	Pore diameter (nm)[d]
Zr-BDC	257.9	0.20	4.5
Zr-HBA	87.3	0.21	8.0

[a]The sample was degassed at 100 °C for 24 h. [b]Surface Area based on multipoint BET method. [c]Pore volume and pore diameter based on BJH method.

2. **Fig. S1**

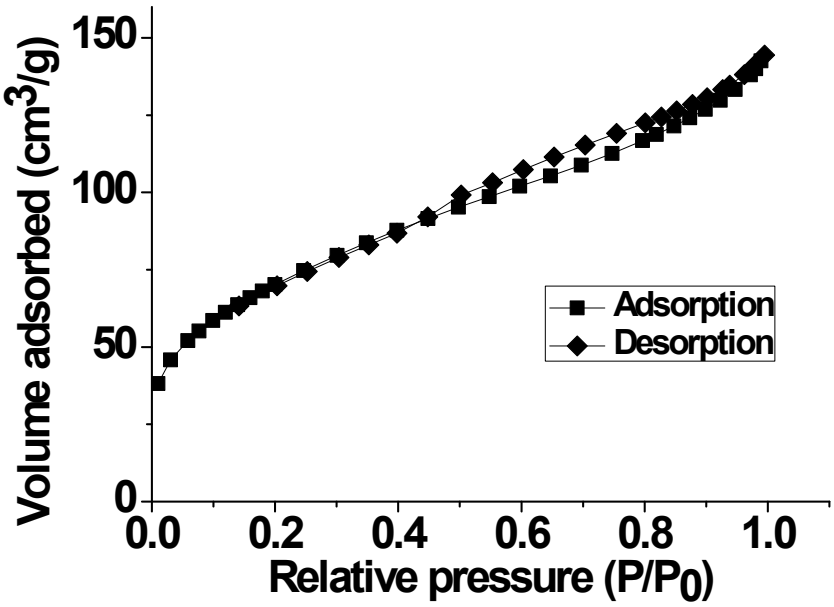

Fig. S1. N_2 adsorption-desorption isotherm for Zr-BDC.

3. **Fig. S2**

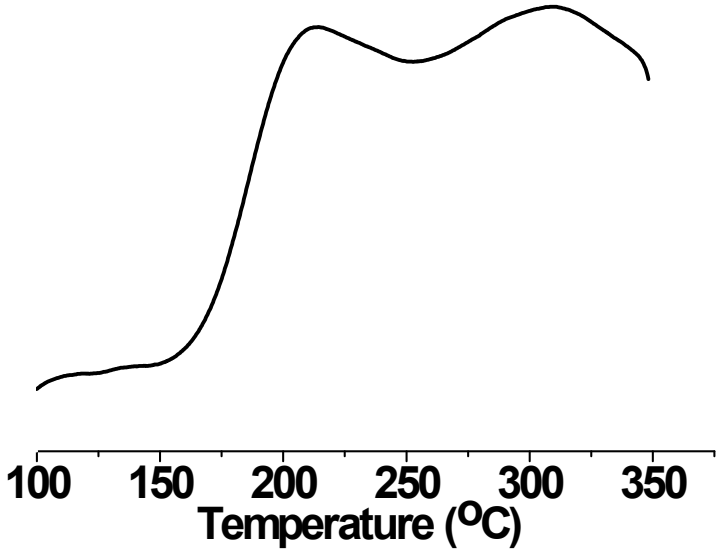

Fig. S2. NH_3-TPD spectra of Zr-HBA. Temperature-programmed desorption of ammonia (NH_3-TPD) was performed on Micromeritics' AutoChem 2950 HP Chemisorption Analyzer. The catalysts were charged into the quartz reactor, and the temperature was increased from room temperature to 150 °C over 1 h at a rate of 10 °C min^{-1} under a flow of He (50 cm^3min^{-1}), and then the temperature was decreased to 50 °C. NH_3/He (10/90, 50 cm^3min^{-1}) was pulsed into the reactor at 50 °C under a flow of He (10 cm^3min^{-1}) until the acid sites were saturated with NH_3. The adsorbed NH_3 was removed by a flow of He (50 cm^3min^{-1}). When the baseline was stable, the temperature was increased from 50 °C to 350 °C at a rate of 10 °C min^{-1}. The NH_3-TPD curve of the Zr-HBA was shown in Fig. S2. Due to the decomposition temperature of the as-prepared catalyst was about 350 °C, the test could conduct under the temperature lower than 350 °C. It could be found that there existed large amounts of acid sites, which were mainly resulted from Zr^{4+} (*RSC Adv., 2013, 3, 10277*).

4. Fig. S3

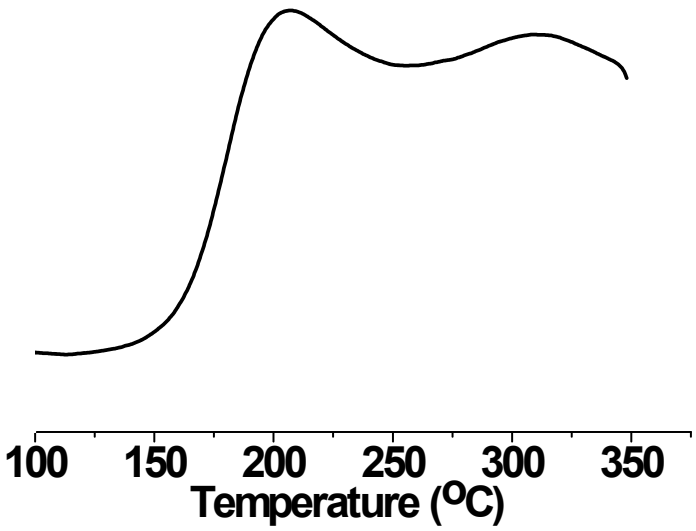

Fig. S3. CO_2-TPD spectra of Zr-HBA. Temperature-programmed desorption of carbon dioxide (CO_2-TPD) was performed on Micromeritics' AutoChem 2950 HP Chemisorption Analyzer. The catalysts were charged into the quartz reactor, and the temperature was increased from room temperature to 150 °C over 1 h at a rate of 10 °C min^{-1} under a flow of He (50 cm^3min^{-1}), and then the temperature was decreased to 50 °C. CO_2 (50 cm^3min^{-1}) was pulsed into the reactor at 50 °C under a flow of He (10 cm^3min^{-1}) until the acid sites were saturated with CO_2. The adsorbed CO_2 was removed by a flow of He (50 cm^3min^{-1}). When the baseline was stable, the temperature was increased from 50 °C to 350 °C at a rate of 10 °C min^{-1}. The CO_2-TPD curve of the Zr-HBA was shown in Fig. S3. Due to the decomposition temperature of the as-prepared catalyst was about 350 °C, the test could conduct under the temperature lower than 350 °C. It could be found that there existed large amounts of basic sites, which were mainly resulted from O^{2-} in the carboxylate and phenate groups (*RSC Adv., 2013, 3, 10277*).

5. **Fig. S4**

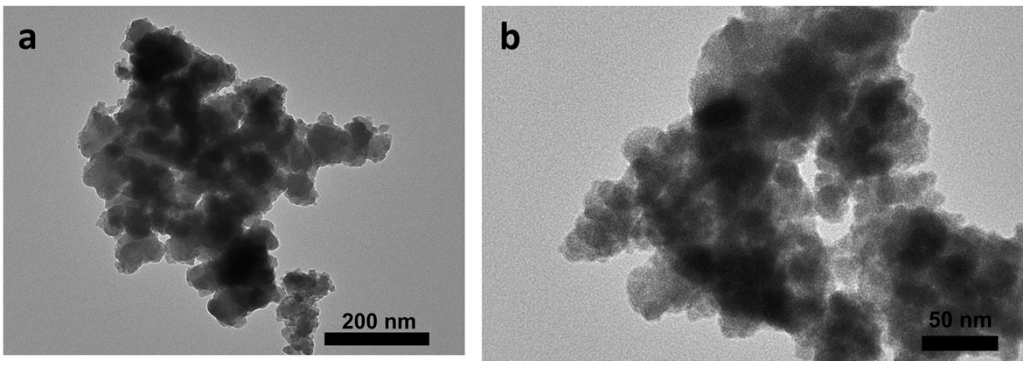

Fig. S4. TEM image of the as-prepared Zr-HBA.