Mesoporous ZrO$_2$ Nanopowder Catalysts for the Synthesis of 5-Hydroxymethylfurfural

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Figure S1. N$_2$ adsorption-desorption isotherms of HPS.
**Figure S2.** $\text{N}_2$ adsorption-desorption isotherms of ZrO$_2$ samples calcined at different temperature (450 °C, 550 °C, 650 °C, and 750 °C).

**Figure S3.** $\text{N}_2$ adsorption-desorption isotherms of different sulfate ZrO$_2$ samples (0.25M-ZrO$_2$/SO$_4^{2-}$, 0.50M-ZrO$_2$/SO$_4^{2-}$, 0.75M-ZrO$_2$/SO$_4^{2-}$).
Figure S4. NH$_3$-TPD curve of sulfate commercial ZrO$_2$ and porous ZrO$_2$.

Figure S5. The conversion of the dehydration reaction by different catalysts. Reaction conditions: D-fructose 100 mg, catalyst 50 mg and DMSO 10 ml at 120 °C for 60 min.