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<AT>A novel mesoporous sulfated zirconium solid acid catalyst for Friedel-Crafts benzylation reaction

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Highlights►

<ABS-Head><ABS-HEAD>Graphical abstract

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<ABS-P><xps:span class="xps_Image">fx1</xps:span><ABS-HEAD> ► Highlights

► A novel mesoporous ZrO₂/SO₄²⁻ has been prepared via a facile one-pot EISA strategy. ► The M-ZrO₂/SO₄²⁻ exhibited excellent textural and acidic properties. ► The introduced S species were homogeneously dispersed in mesoporous skeleton. ► The M-ZrO₂/SO₄²⁻ exhibited excellent catalytic performance and reusability.

<ABS-HEAD>**Abstract**

<ABS-P>In this paper, a novel mesoporous sulfated zirconium (M-ZrO₂/SO₄²⁻) has been gotten by one-pot evaporation-induced self-assembly (one-pot EISA) strategy. The SXRD, N₂-physisorption and TEM characterization techniques indicated that M-ZrO₂/SO₄²⁻ possessed distinct mesostructure with big specific surface area (133.5 m²·g⁻¹), large pore volume (0.18 cm³·g⁻¹) and narrow pore size distribution (4.90 nm). Moreover, the existing states and the influence in mesostructure of introduced S species were detailedly investigated by the XRD, N₂-physisorption, TEM, TG-DSC, FT-IR and XPS techniques and the results showed that the S species, which existed as the type of SO₄²⁻, improved the textural properties of prepared materials. In addition, the NH₃-TPD and IR spectra of adsorbed pyridine indicated the existence of strong Brønsted and Lewis acid sites in M-ZrO₂/SO₄²⁻ even evacuated at 400 °C. Furthermore, the M-ZrO₂/SO₄²⁻ was used as a promise solid acid catalyst and displayed excellent catalytic performance and reusability in Friedel-Crafts benzylation reaction.

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