

Mesoporous catalyst supports based on ZnO–ZnAl₂O₄ nanocomposites with enhanced selectivity and coking resistance in isobutane dehydrogenation

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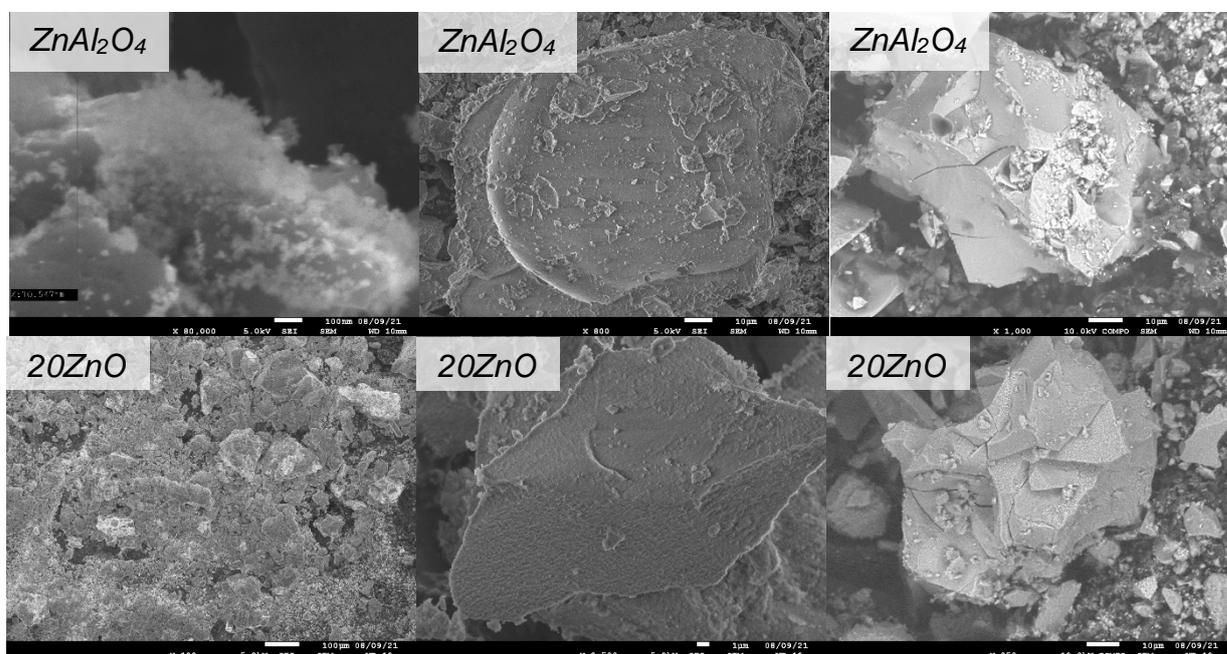


Figure S1. SEM images of the synthesized materials.

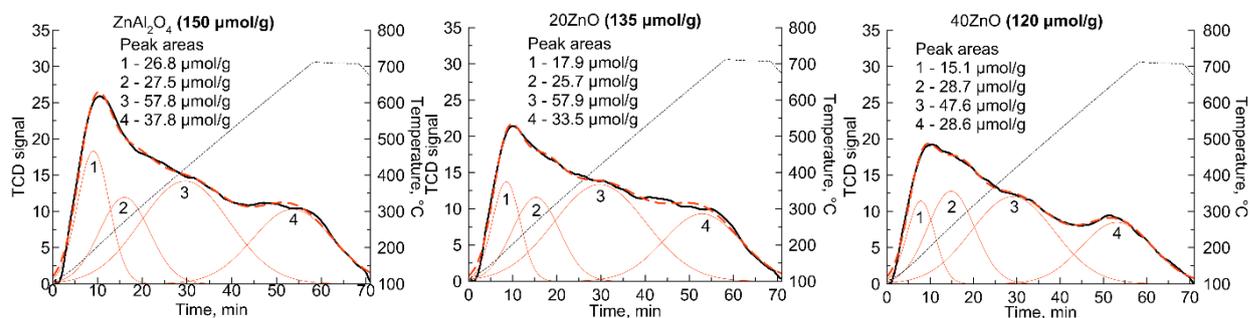


Figure S2. Multi-peak Gaussian fitting for the samples calcined at 700 °C.

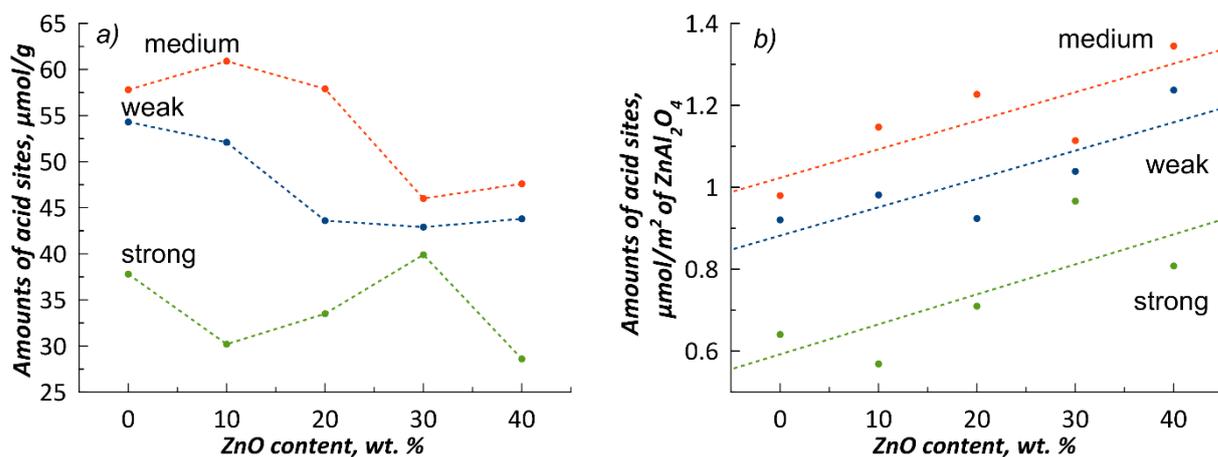


Figure S3. Acidity dependence of weak, medium, and strong acid sites on the ZnO content for the samples calcined at 700 °C.

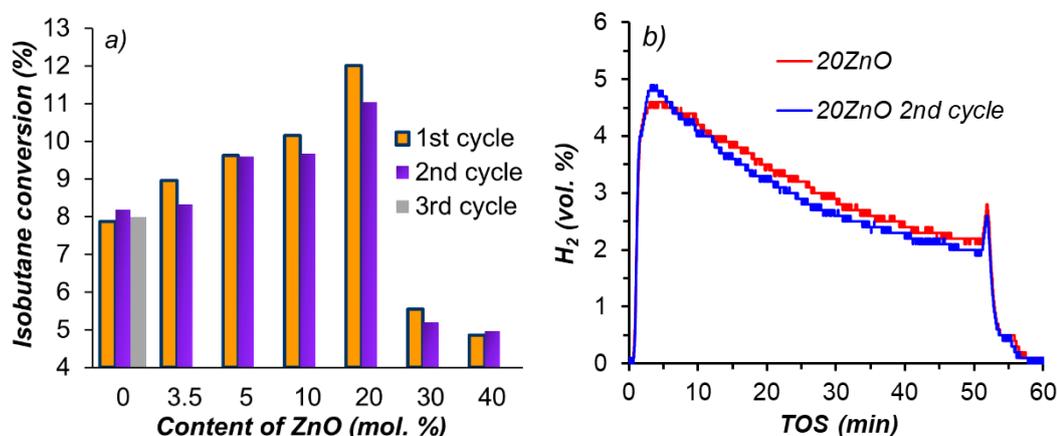


Figure S4. Isobutane conversion depending on the ZnO content, obtained after 10 min of dehydrogenation in the 1st, 2nd and 3rd cycle (full cycle: dehydrogenation 50 min – helium purge – air regeneration – helium purge) (a); evolution of H₂ during isobutane dehydrogenation on 20ZnO–80ZnAl₂O₄ (b). Reaction conditions: 550 °C, 20 ml/min of isobutane : He = 40 : 60.

Table S1. Isobutane conversion, space time yield (STY) of isobutene and isobutene selectivity. Reaction conditions: 550 °C, 10 min, iso-C₄H₁₀:N₂ = 40:60, contact time of 0.24 g·s·ml⁻¹.

Catalyst	Conversion, %	Selectivity to iso-C ₄ H ₈ , mol. %	STY, kg/(h·m ³)	Reference
20ZnO–80ZnAl ₂ O ₄	12	95	1704	This work
Cr ₁₀ Zr ₉₀ O _x	36	81	5861	[38]
Cr ₂ O ₃ /Al ₂ O ₃	7	92	950	This work

Note: STY = mass flow of isobutene (kg/h) / volume of the catalyst (m³)