

Support Effect of Ga-Based Catalysts in the CO₂-Assisted Oxidative Dehydrogenation of Propane

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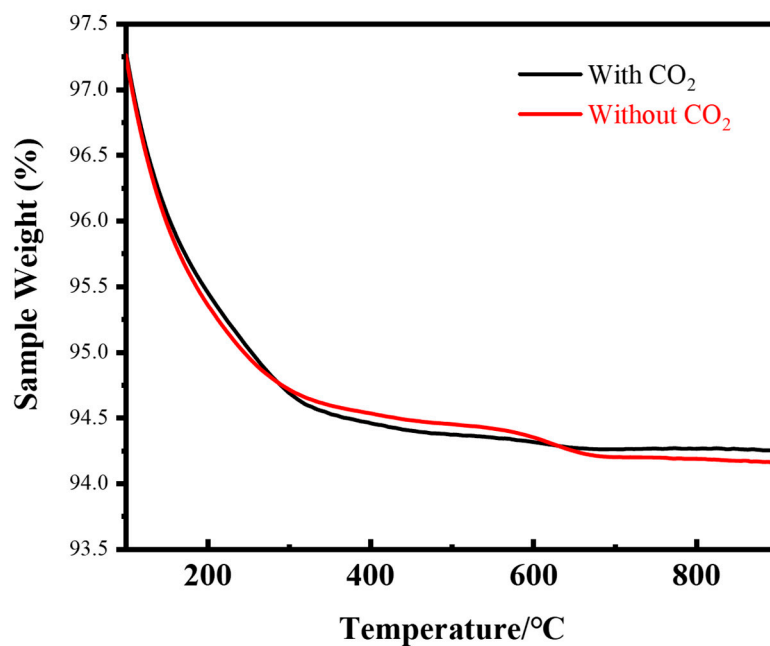


Figure S1. TGA profiles for spent Ga/ZSM-5(28) after ODHP in the presence and absence of CO₂ under air condition from 100°C to 900°C.

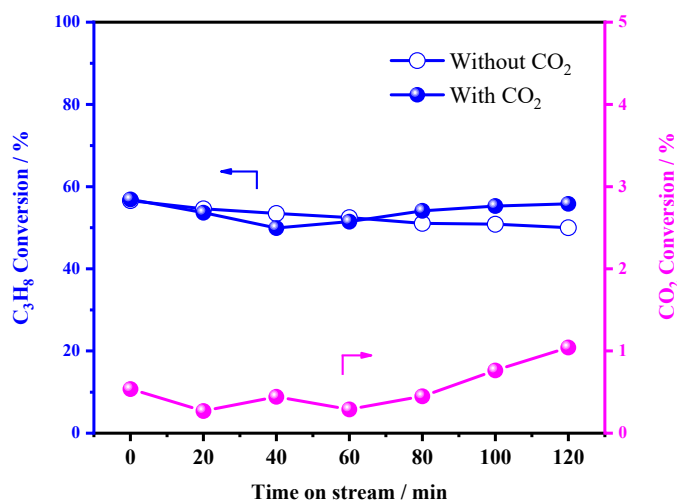


Figure S2. The performance over Ga/ZSM-5 (28) in the ODHP reaction with and without CO₂. Reaction conditions: $m_{\text{cat}} = 0.5\text{g}$, $T = 600\text{ }^{\circ}\text{C}$, $P = 0.1\text{ MPa}$, $\text{GHSV} = 7200\text{ mL g}_{\text{cat}}^{-1}\text{ h}^{-1}$, $\text{CO}_2:\text{C}_3\text{H}_8:\text{N}_2 = 1:1:18$.

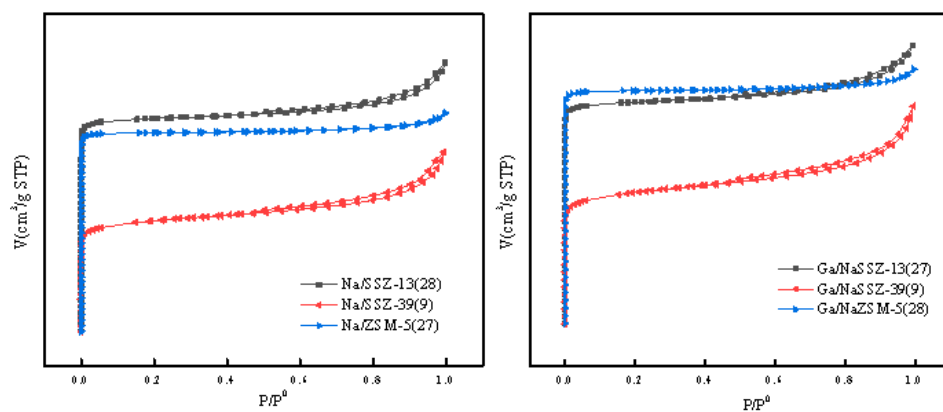


Figure S3. The adsorption isotherm of the pure and Ga-modified zeolite samples

Table S1. ICP-OES measurements of the Ga-based catalysts before and after the reaction.

Zeolite	Ga Loading (%)	
	Before reaction	After reaction
Ga/SSZ-13(27)	0.22%	0.17%
Ga/SSZ-39(9)	0.23%	0.15%
Ga/ZSM-5(28)	0.22%	0.11%

Table S2. Relative acid strength of Ga/Na-ZSM-5(28) and Ga/Na-SSZ-39(9) catalysts

Zeolites	weak acid	moderate strong acid	strong acid
Ga/ZSM-5(28)	263213	537195	340579
Ga/SSZ-39(9)	228061	593547	257701

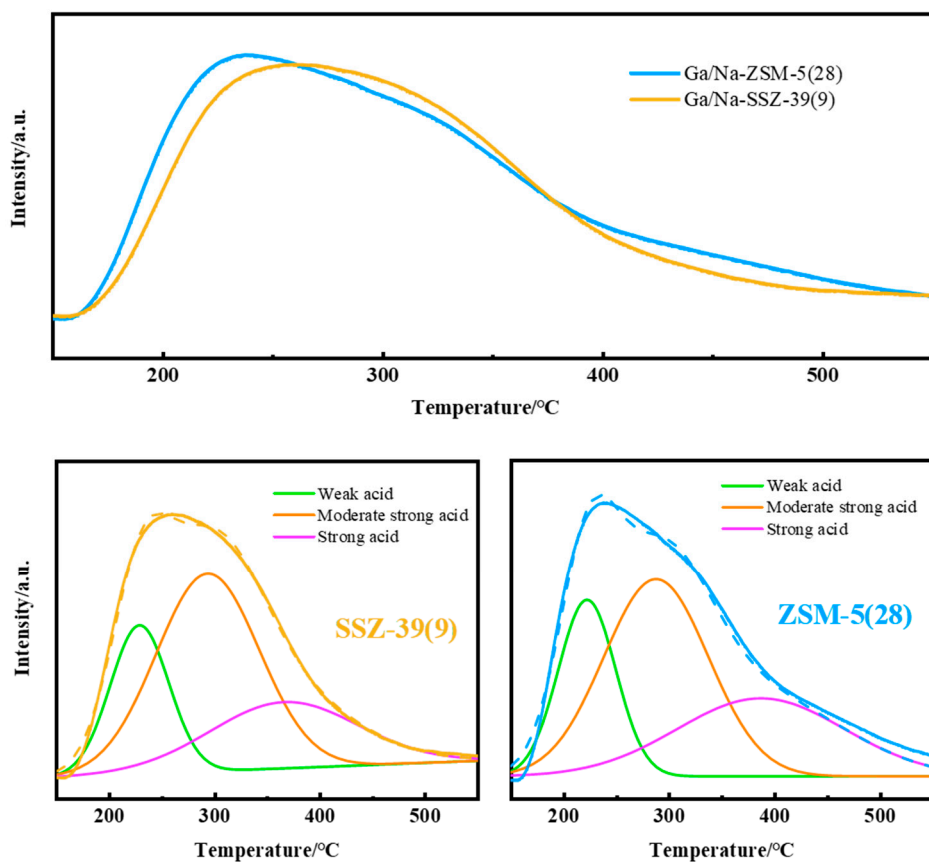


Figure S4. NH₃-TPD profiles of the Ga/Na-ZSM-5(28) and Ga/Na-SSZ-39(9) catalysts

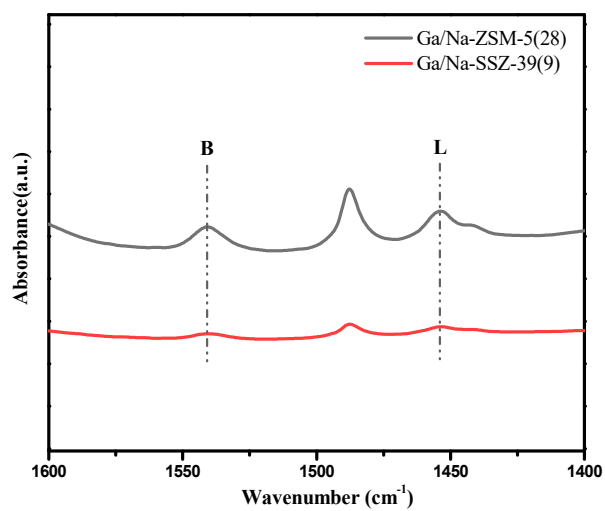


Figure S5. Py-FTIR spectra of the Ga/Na-ZSM-5(28) and Ga/Na-SSZ-39(9) catalysts thermal treated at 300 °C

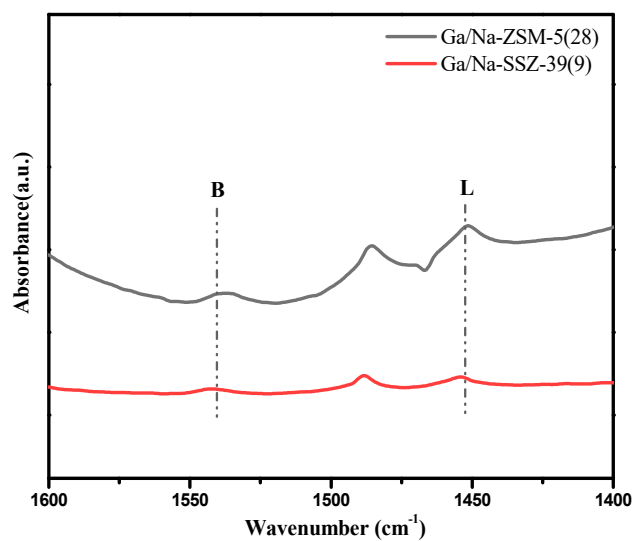


Figure S6. Py-FTIR spectra of the Ga/Na-ZSM-5(28) and Ga/Na-SSZ-39(9) catalysts thermal treated at 450 °C

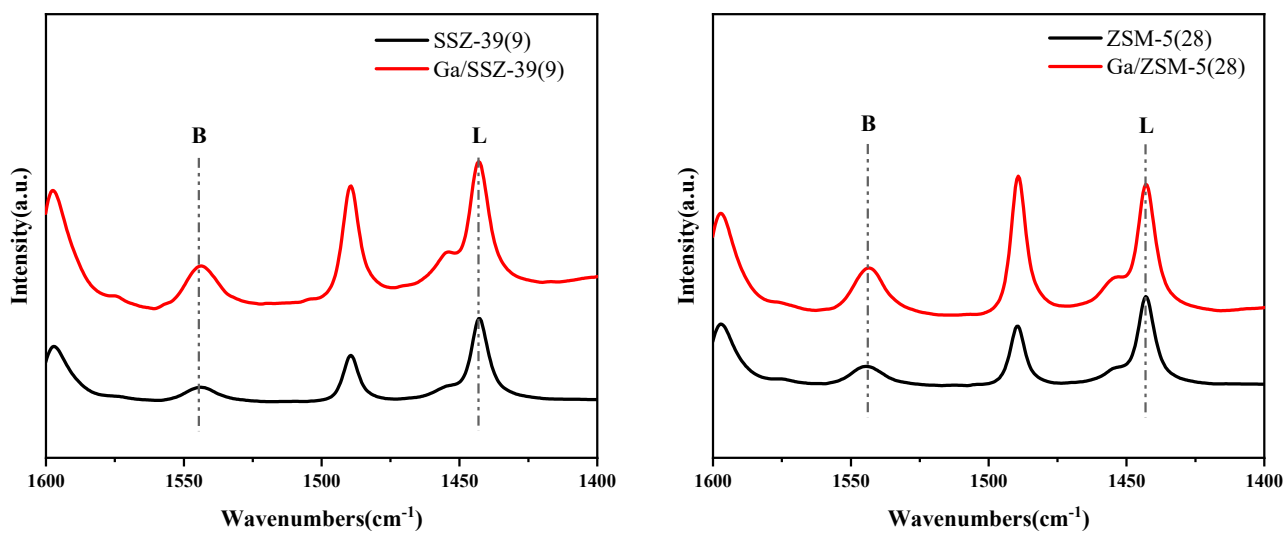


Figure S7. Py-FTIR spectra of the Ga/ZSM-5 (28), Ga/Na-SSZ-39(9) samples and their pristine materials.