

## Supplementary Information

### Light Alkane Interactions on Transition Metal Oxides like Zirconia using a combined Frequency Response and DRIFTS study

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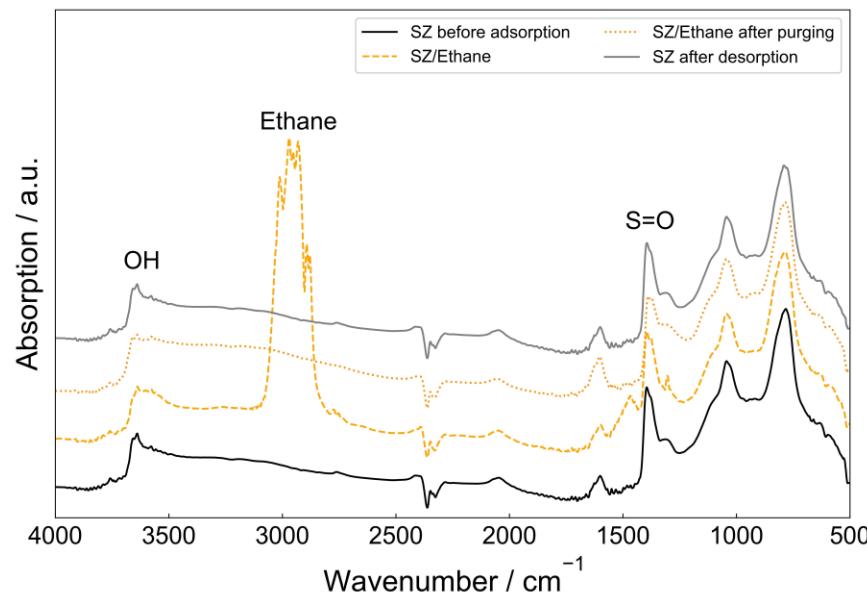


Figure 1: DRIFT spectra of SZ before adsorption, with adsorbed ethane, with adsorbed ethane after purging and after desorption at 35 °C.

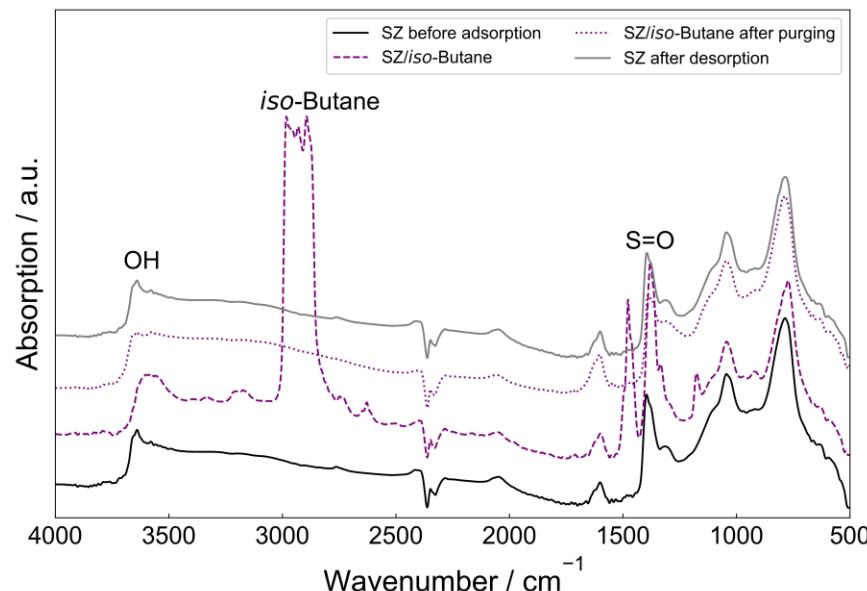


Figure 2: DRIFT spectra of SZ before adsorption, with adsorbed iso-butane, with adsorbed iso-butane after purging and after desorption at 35 °C.

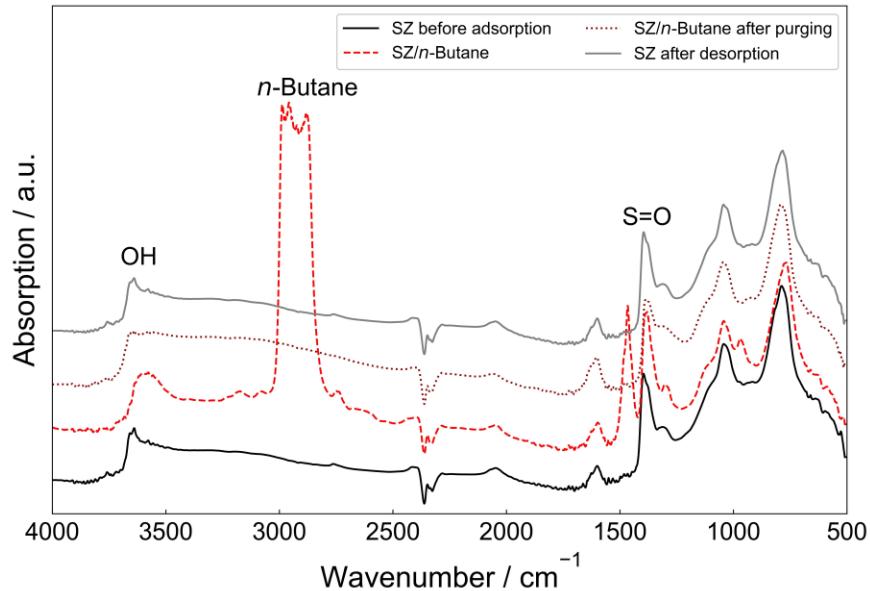


Figure 3: DRIFT spectra of SZ before adsorption, with adsorbed *n*-butane, with adsorbed *n*-butane after purging and after desorption at 35 °C.

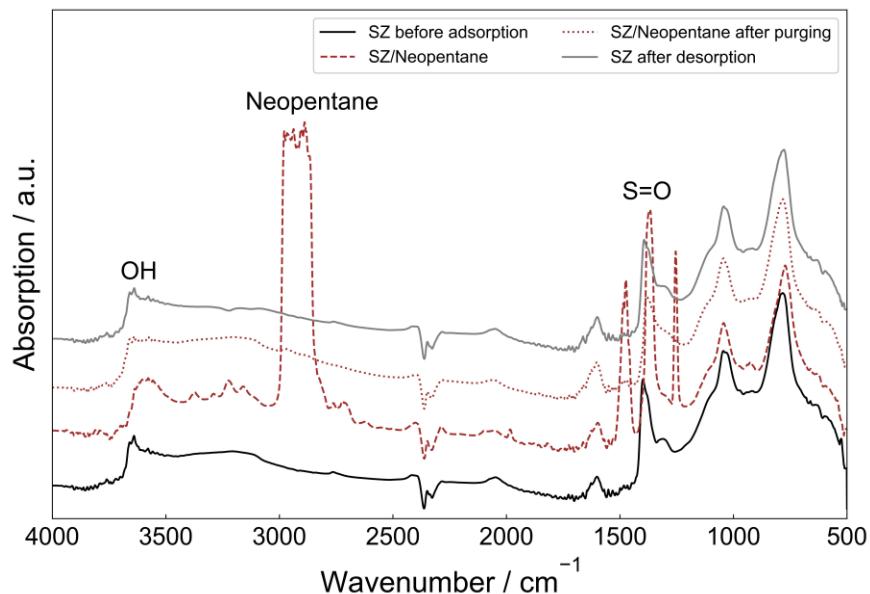


Figure 4: DRIFT spectra of SZ before adsorption, with adsorbed neopentane, with adsorbed neopentane after purging and after desorption at 35 °C.

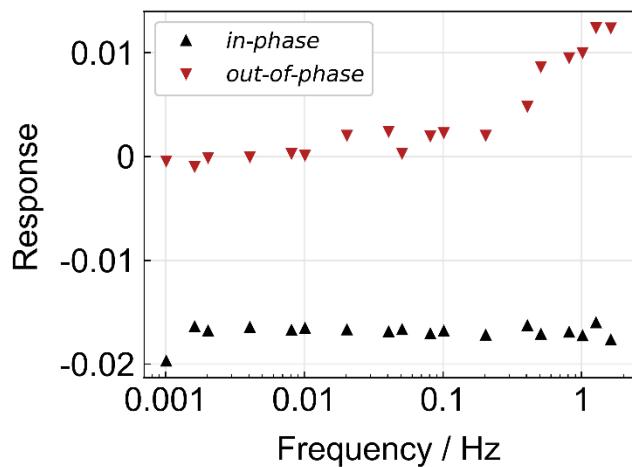


Figure 5: FR spectrum of SZ/argon ( $\vartheta = 35^\circ\text{C}$ ,  $p = 2,3 \text{ kPa}$ ,  $m = 1891 \text{ mg}$ )

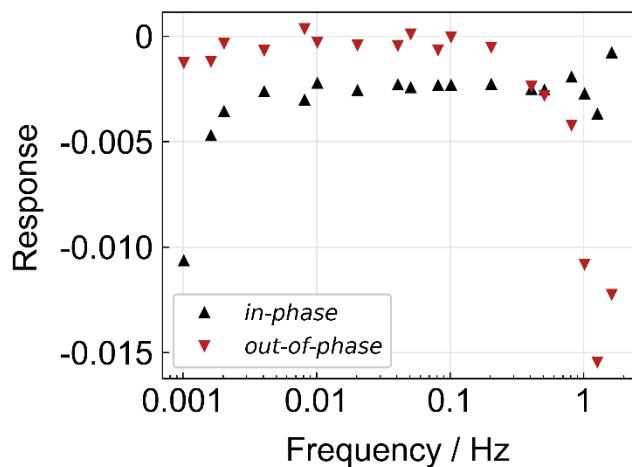


Figure 6: FR spectrum of MCM-41/nitrogen ( $\vartheta = 36^\circ\text{C}$ ,  $p = 2,4 \text{ kPa}$ ,  $m = 315 \text{ mg}$ )

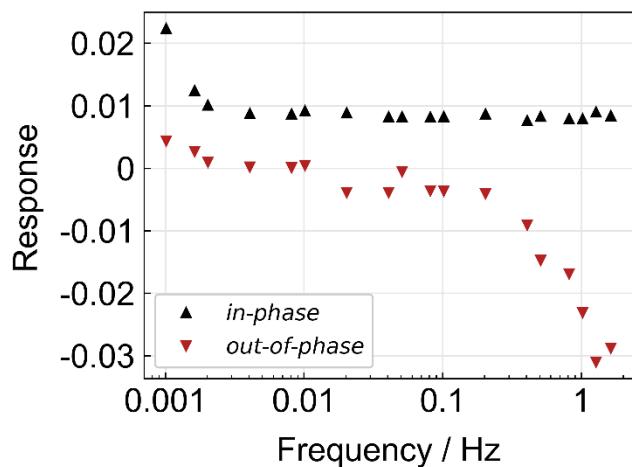


Figure 7: FR spectrum of MCM-41/methane ( $\vartheta = 36^\circ\text{C}$ ,  $p = 2,4 \text{ kPa}$ ,  $m = 315 \text{ mg}$ )

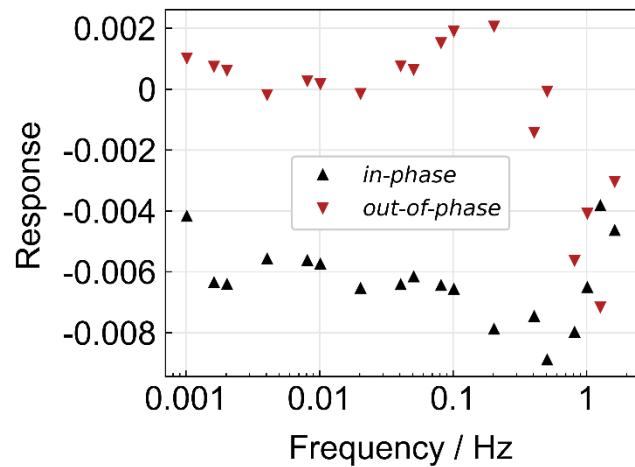


Figure 8: FR spectrum of stainless steel wool/*n*-butane ( $\vartheta = 35^\circ\text{C}$ ,  $p = 2,3 \text{ kPa}$ ,  $m = 356 \text{ mg}$ )

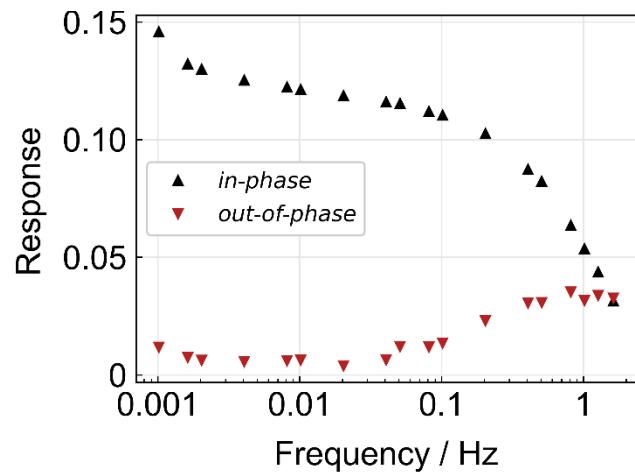


Figure 9: FR spectrum of SZ/propane ( $\vartheta = 36^\circ\text{C}$ ,  $p = 2,4 \text{ kPa}$ ,  $m = 1249 \text{ mg}$ )