

Deactivation of Cu/ZSM-5 Catalysts during the Conversion of 2,3-Butanediol to Butenes

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Supplementary Information

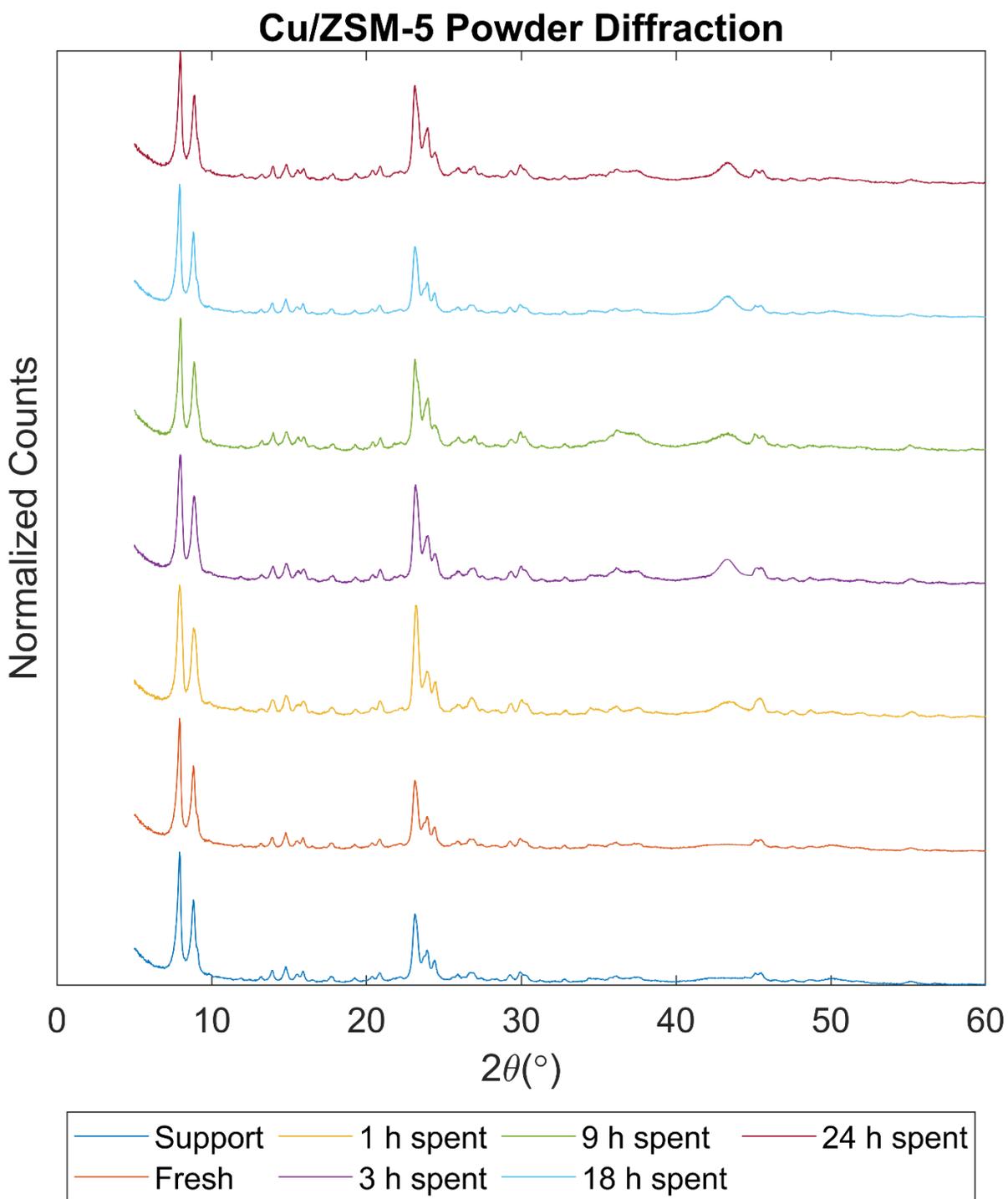


Figure S1. Powder X-ray diffraction patterns for fresh and spent Cu/ZSM-5 samples, including the untreated ZSM-5 support.

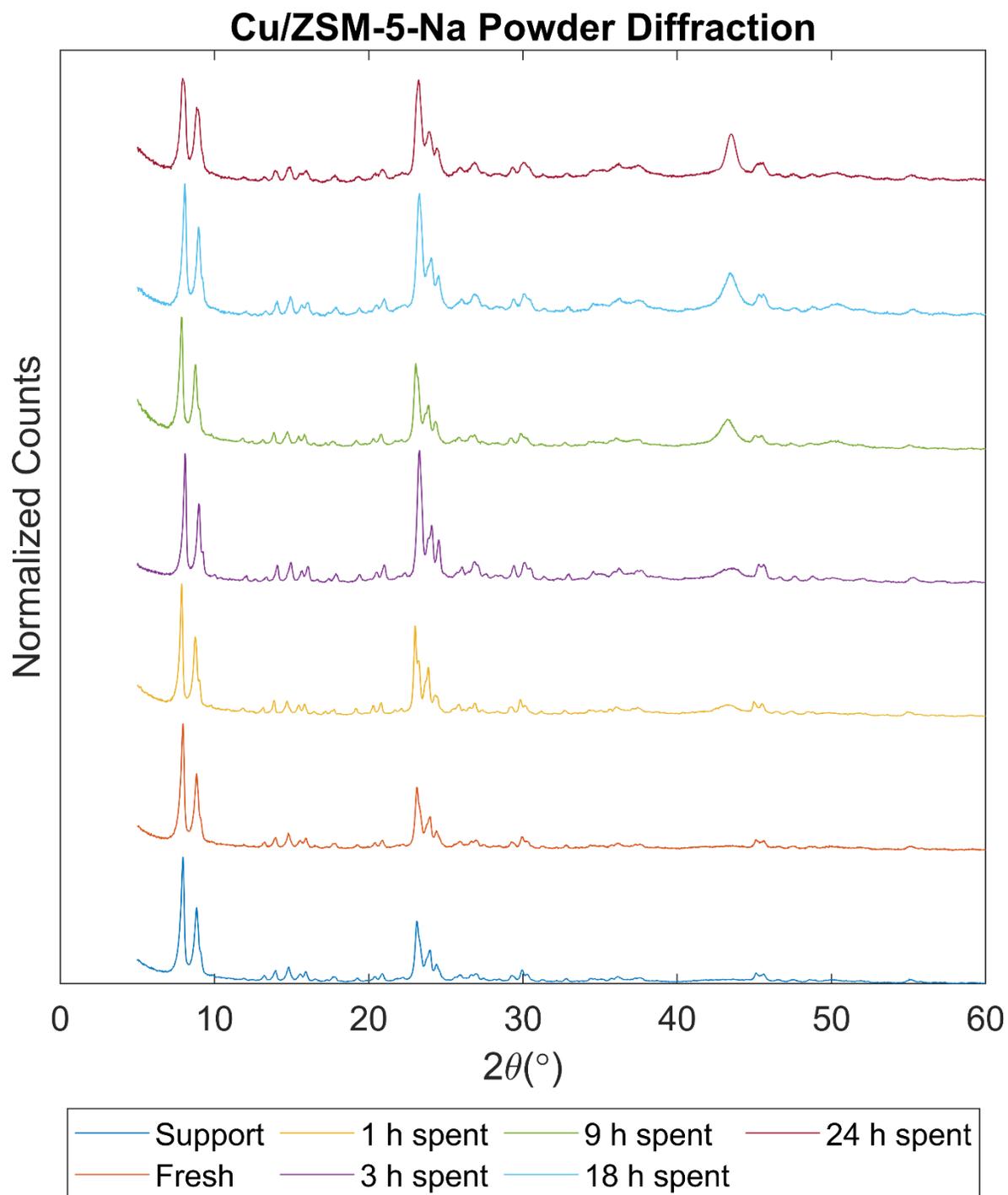


Figure S2. Powder X-ray diffraction patterns for fresh and spent Cu/ZSM-5-Na samples, including the NaOH-treated ZSM-5 support.

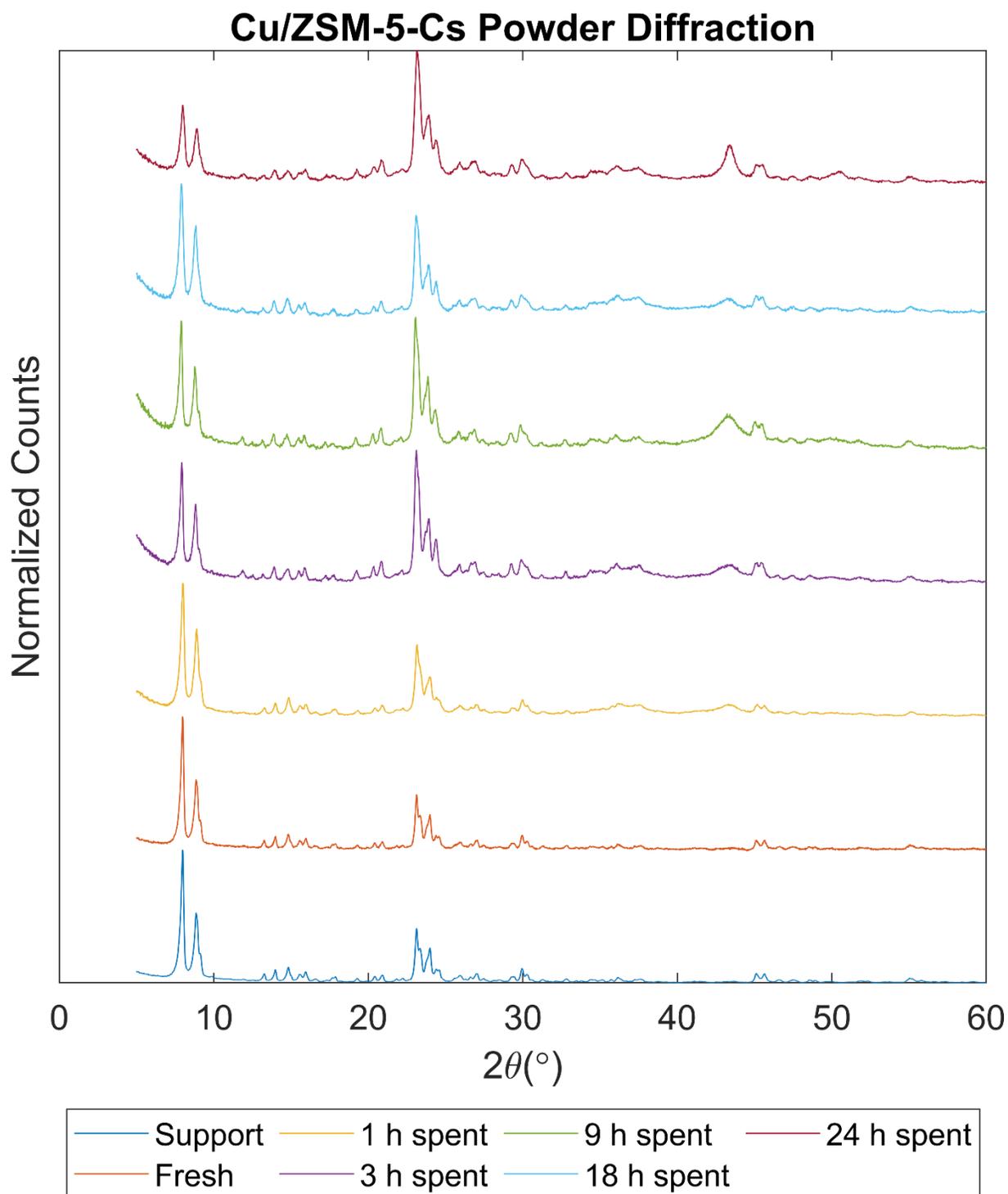


Figure S3. Powder X-ray diffraction patterns for fresh and spent Cu/ZSM-5-Cs samples, including the CsOH-treated ZSM-5 support.

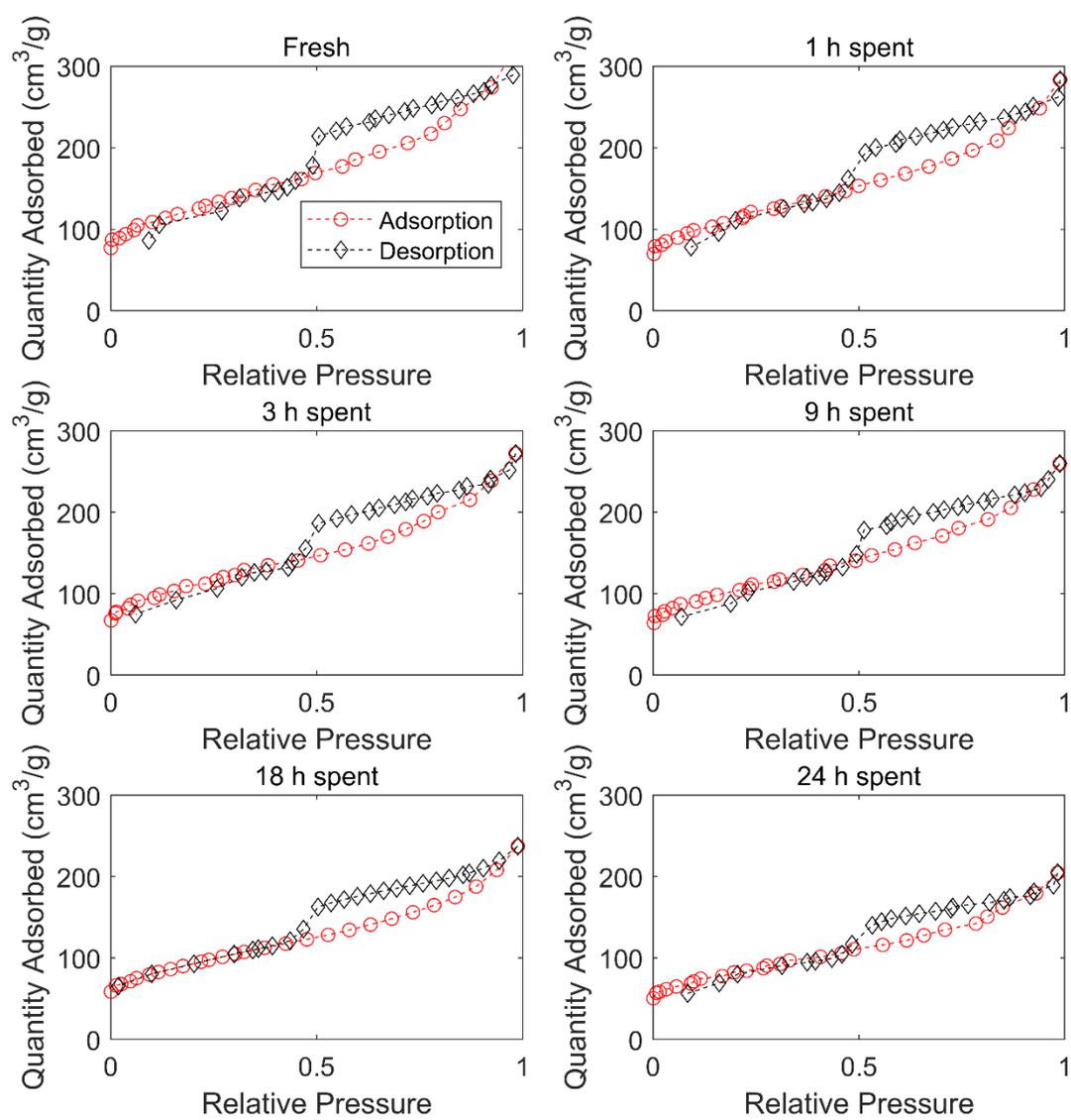


Figure S4. Nitrogen adsorption isotherms for fresh and spent Cu/ZSM-5 samples.

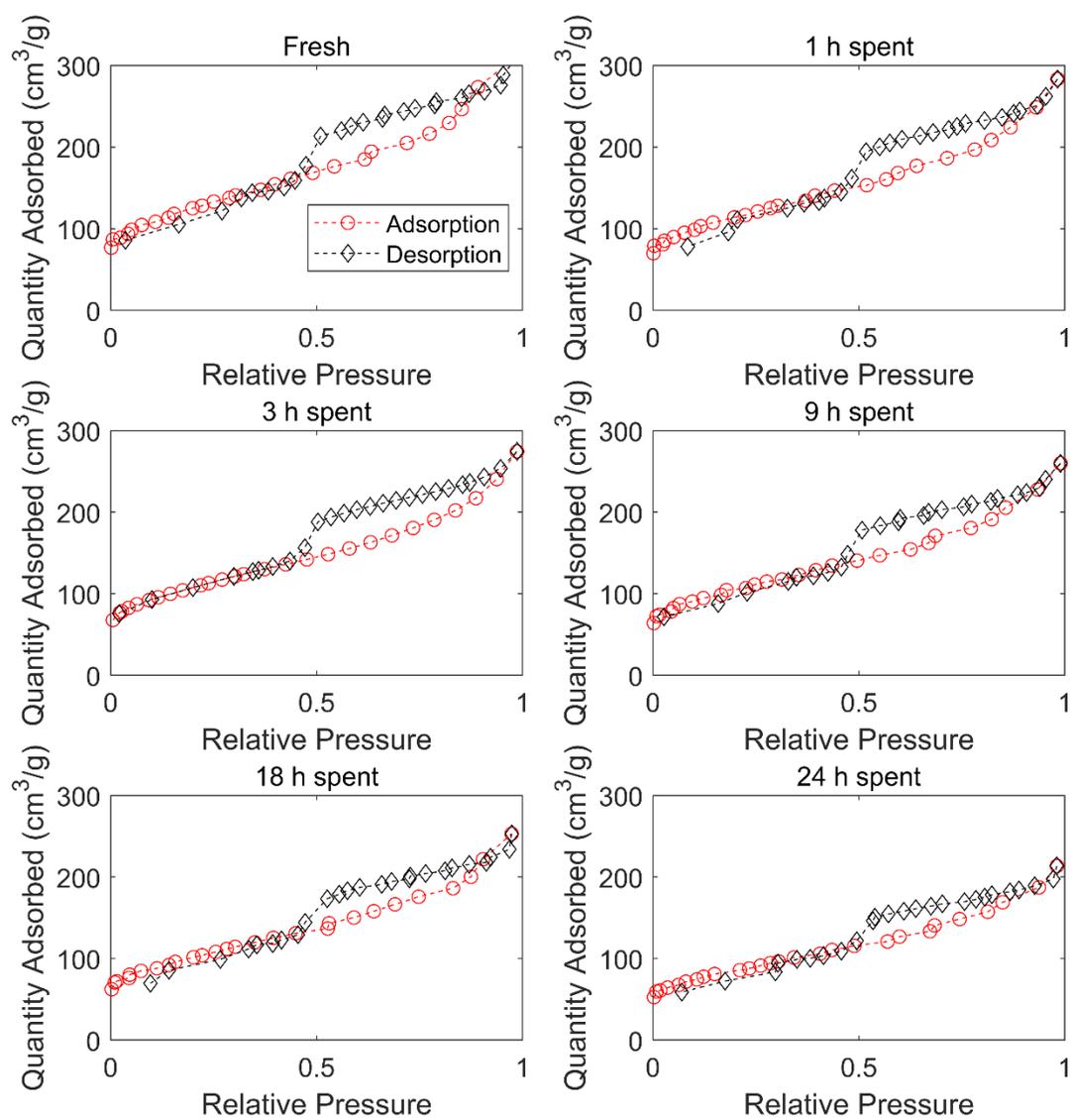


Figure S5. Nitrogen adsorption isotherms for fresh and spent Cu/ZSM-5-Na samples.

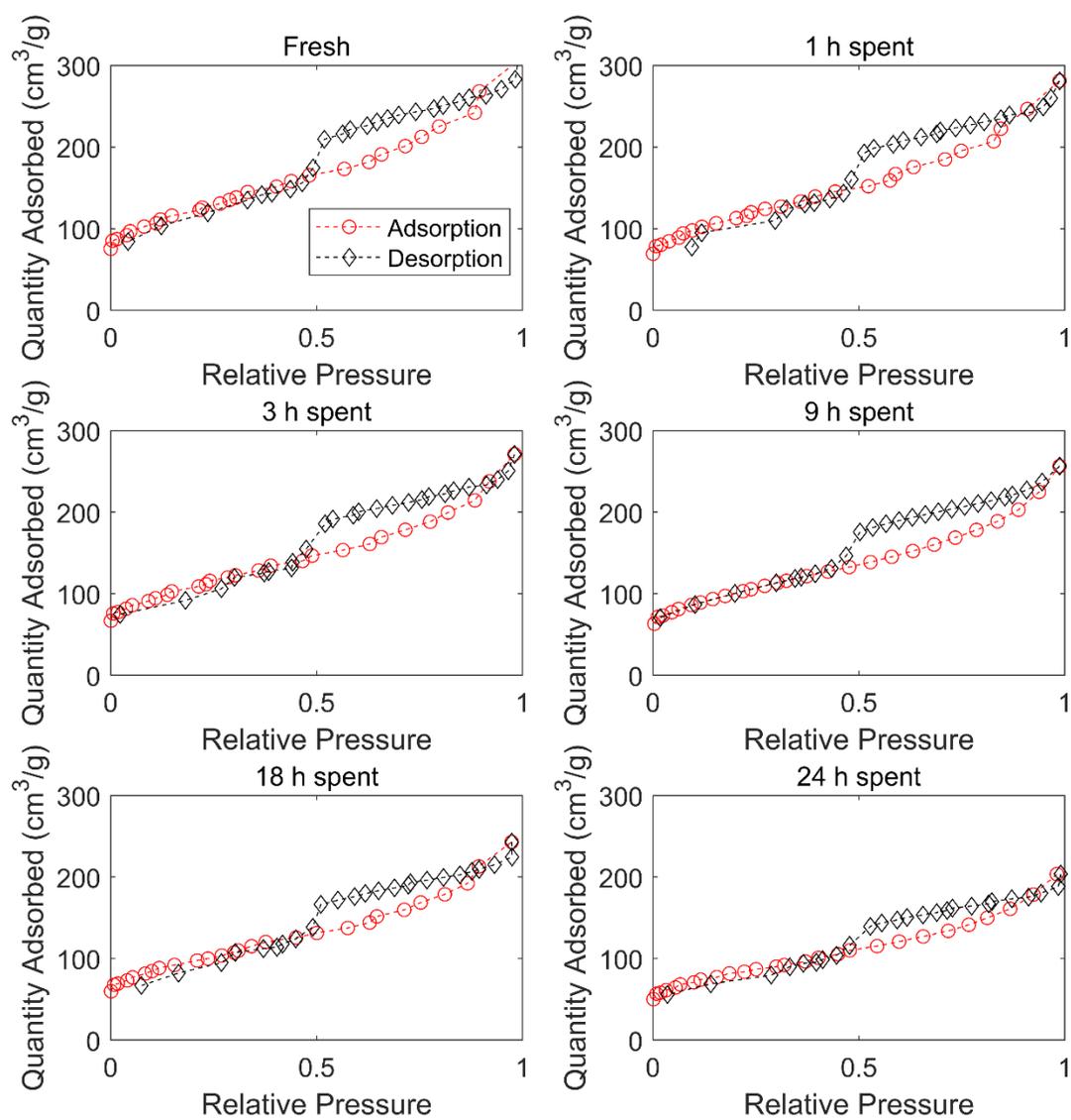


Figure S6. Nitrogen adsorption isotherms for fresh and spent Cu/ZSM-5-Cs samples.

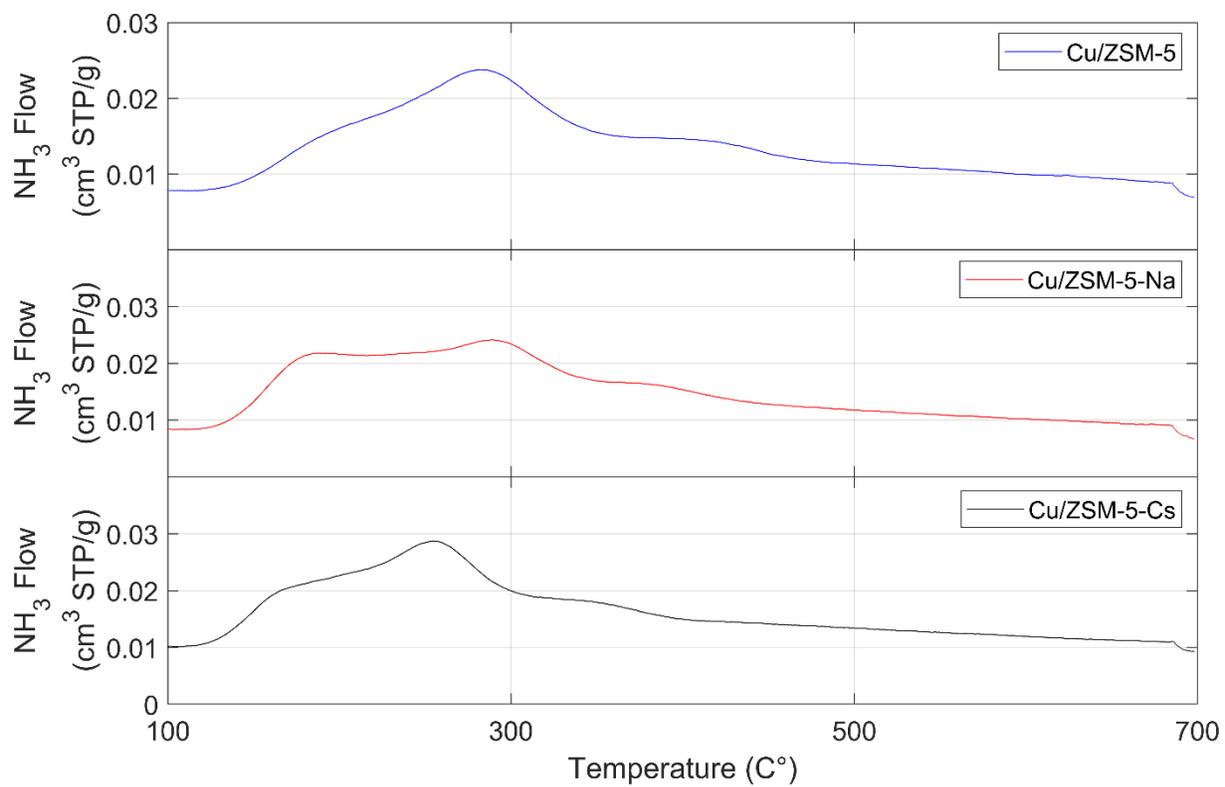


Figure S7. NH_3 -temperature-programmed desorption profile for Cu/ZSM-5, Cu/ZSM-5-Na, and Cu/ZSM-5-Cs.