

Experimental and Theoretical Studies of Sonically Prepared Cu–Y, Cu–USY and Cu–ZSM-5 Catalysts for SCR deNO_x

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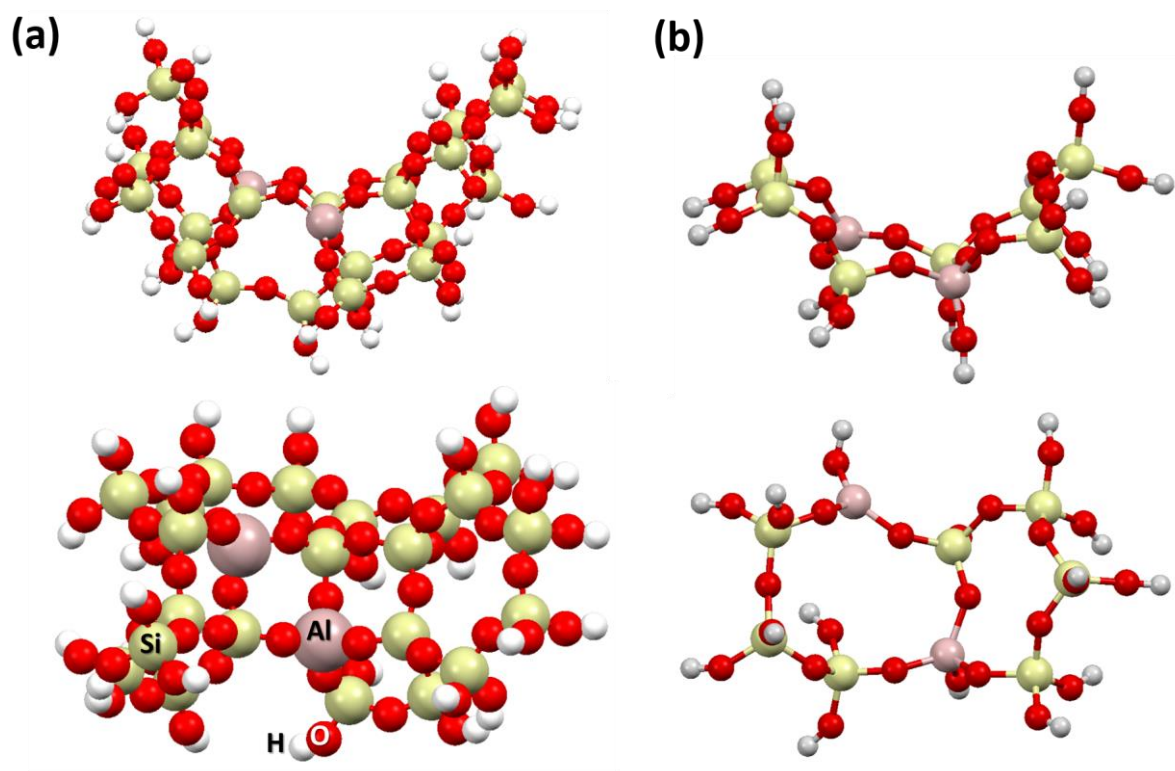


Figure S1. Cluster model of (a) Y/USY ($\text{Al}_2\text{Si}_{22}\text{O}_{66}\text{H}_{36}$) zeolite and (b) ZSM-5 ($\text{Al}_2\text{Si}_7\text{O}_{25}\text{H}_{15}$)

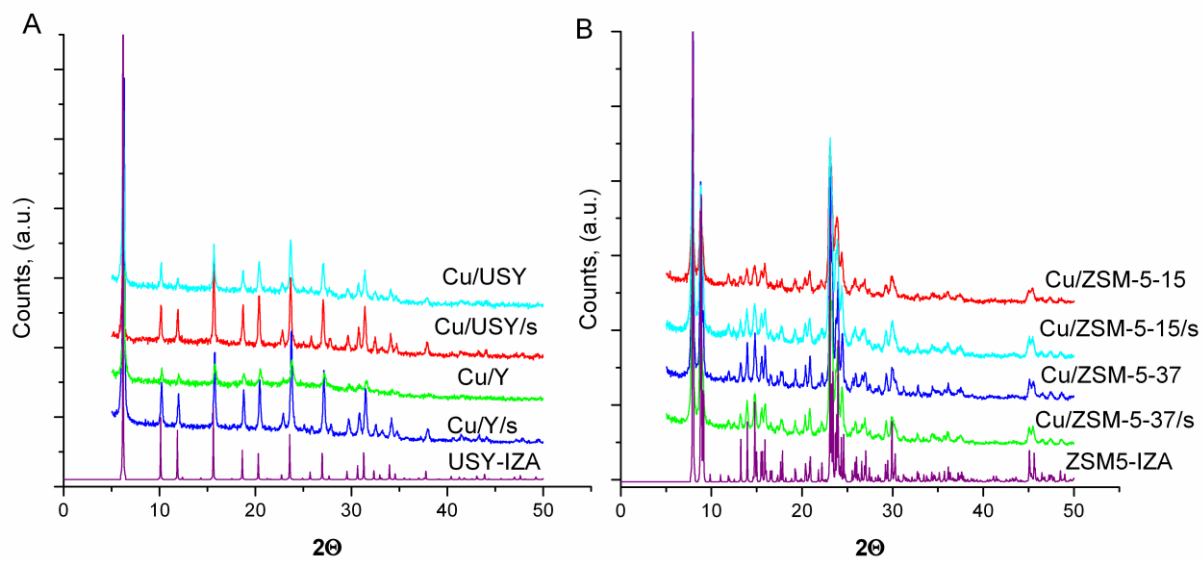


Figure S2. XRD of the zeolites; A) Cu/Y and Cu/USY samples, B) Cu/ZSM-5-15 and Cu/ZSM-5-37 samples

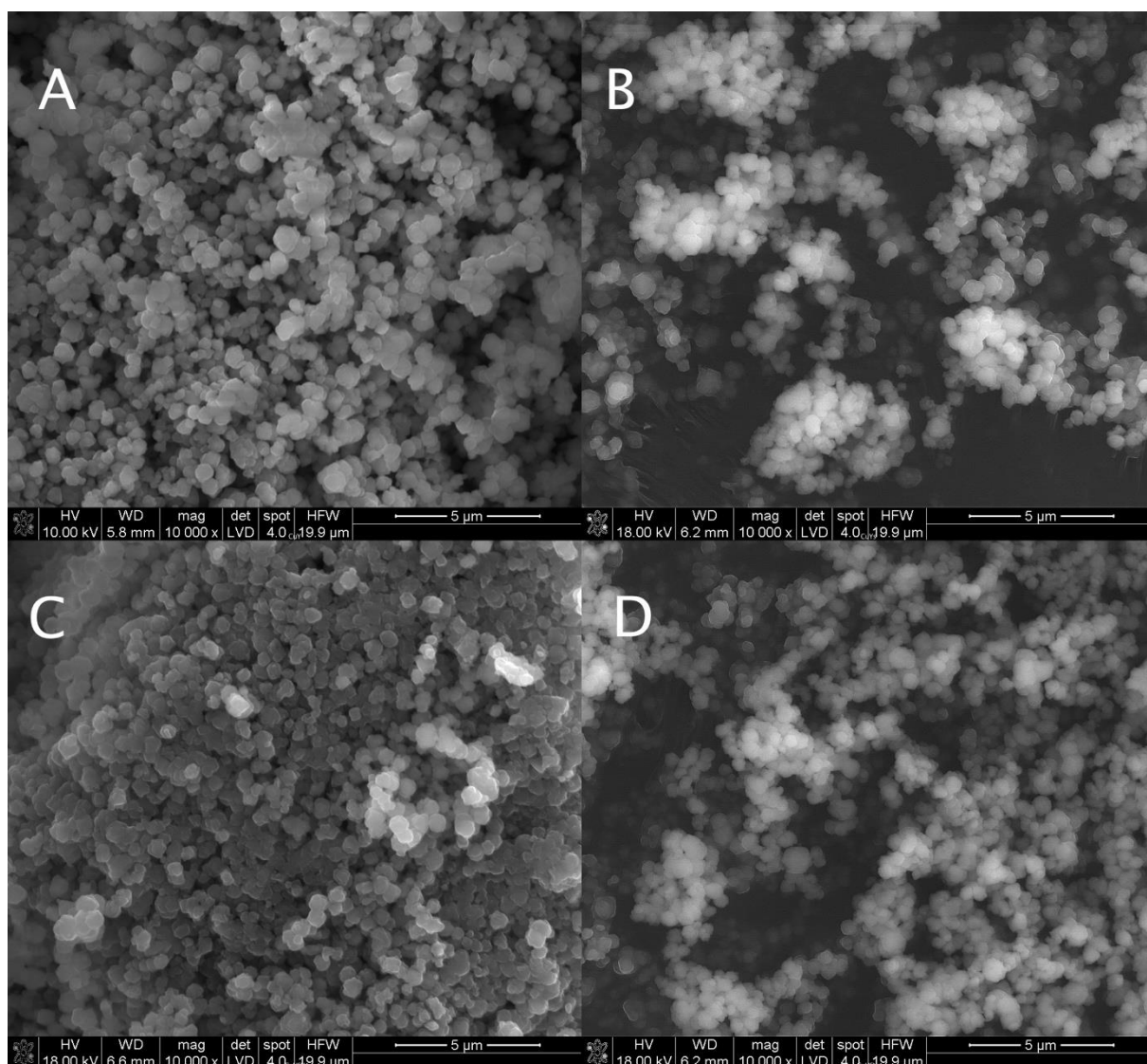


Figure S3. SEM images of Cu/USY and Cu/Y samples; A) Cu/Y, B) Cu/Y/s, C) Cu/USY, D) Cu/USY/s

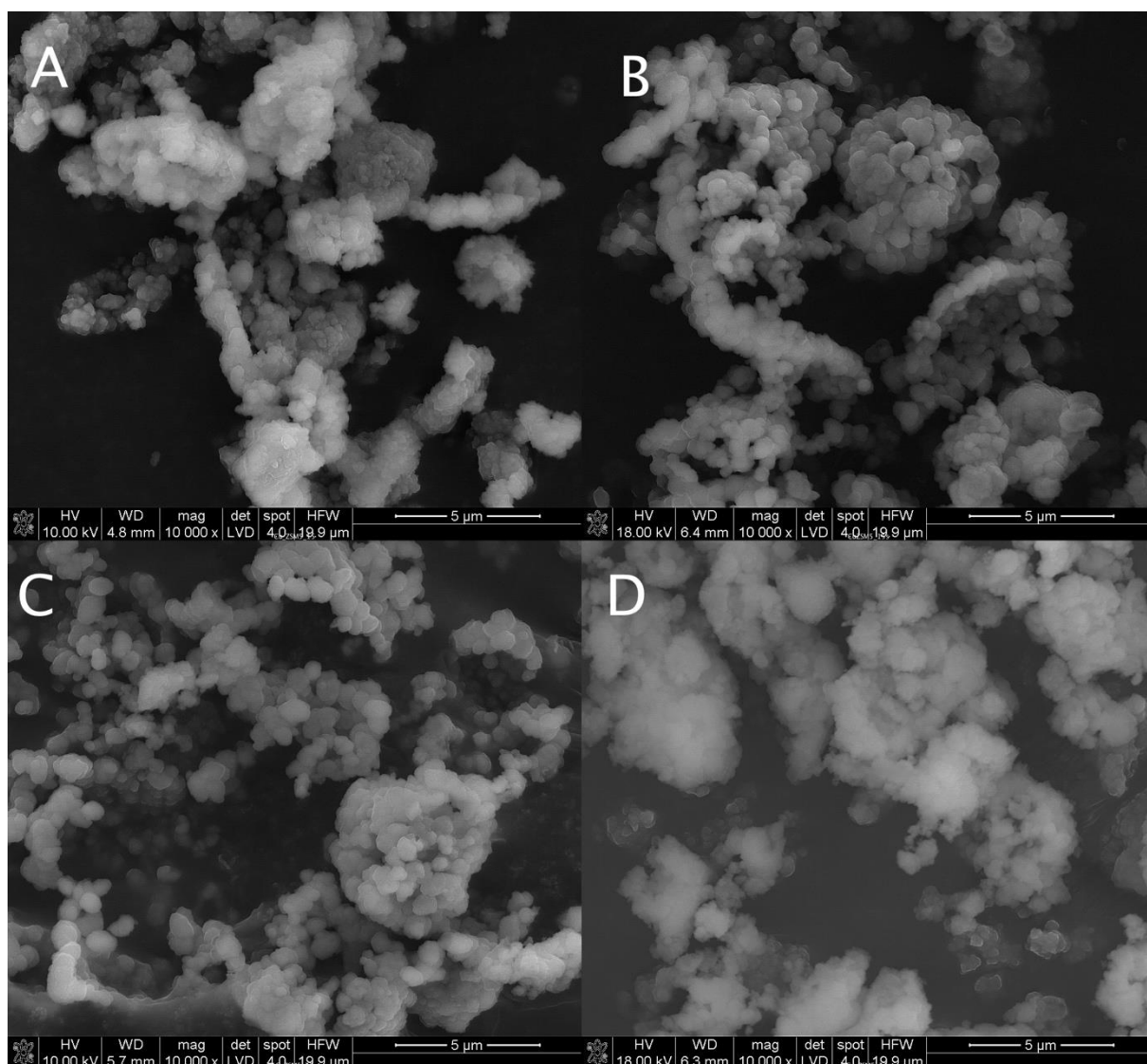


Figure S4. SEM images of Cu/ ZSM-5 samples: A) Cu/ZSM-5-15, B) Cu/ ZSM-5-15/s, C) Cu/ ZSM-5-37, D) Cu/ ZSM-5-37/s

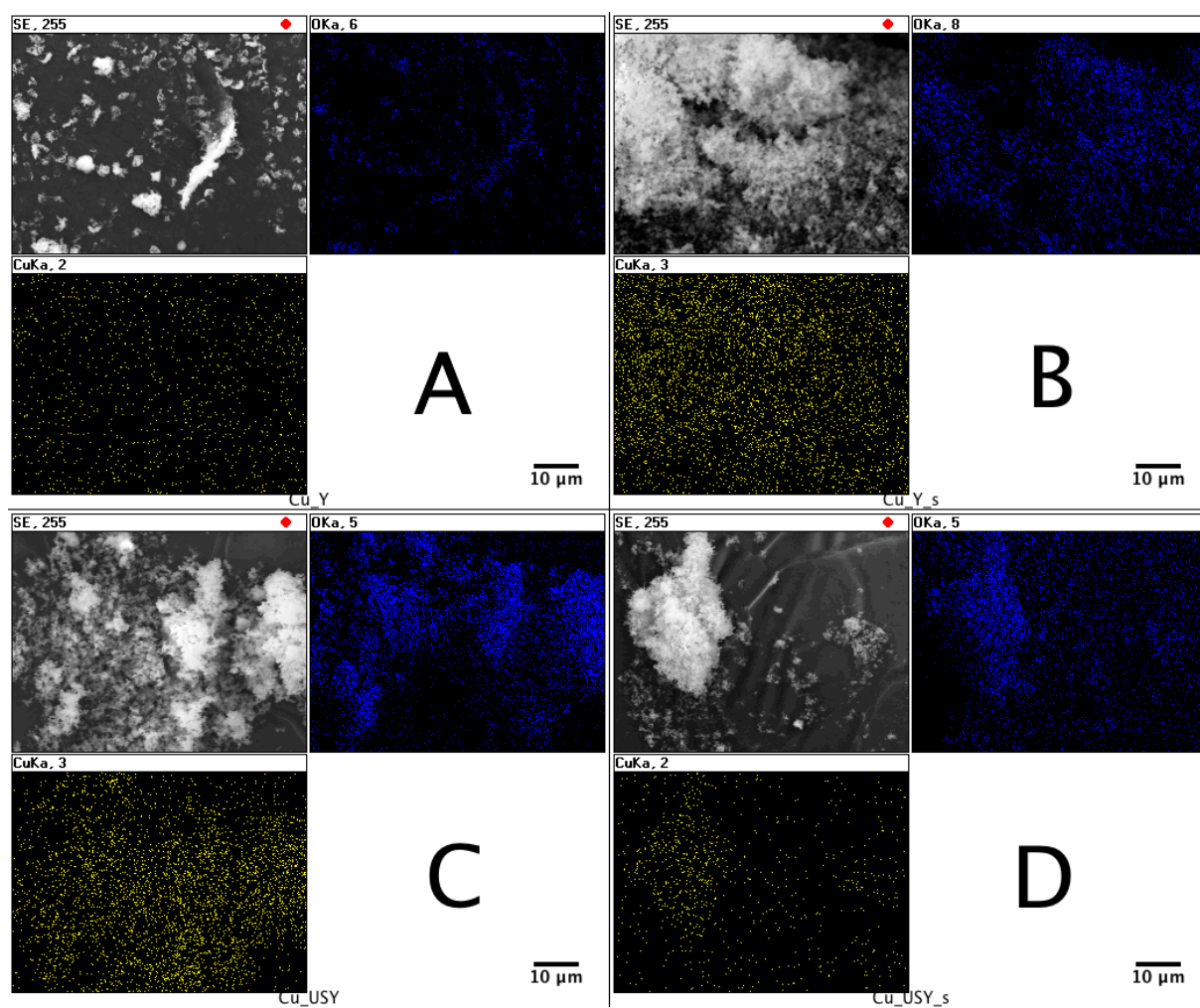


Figure S5. SEM mapping of Cu/USY and Cu/Y samples: A) Cu/Y, B) Cu/Y/s, C) Cu/USY, D) Cu/USY/s; blue-oxygen, yellow-copper

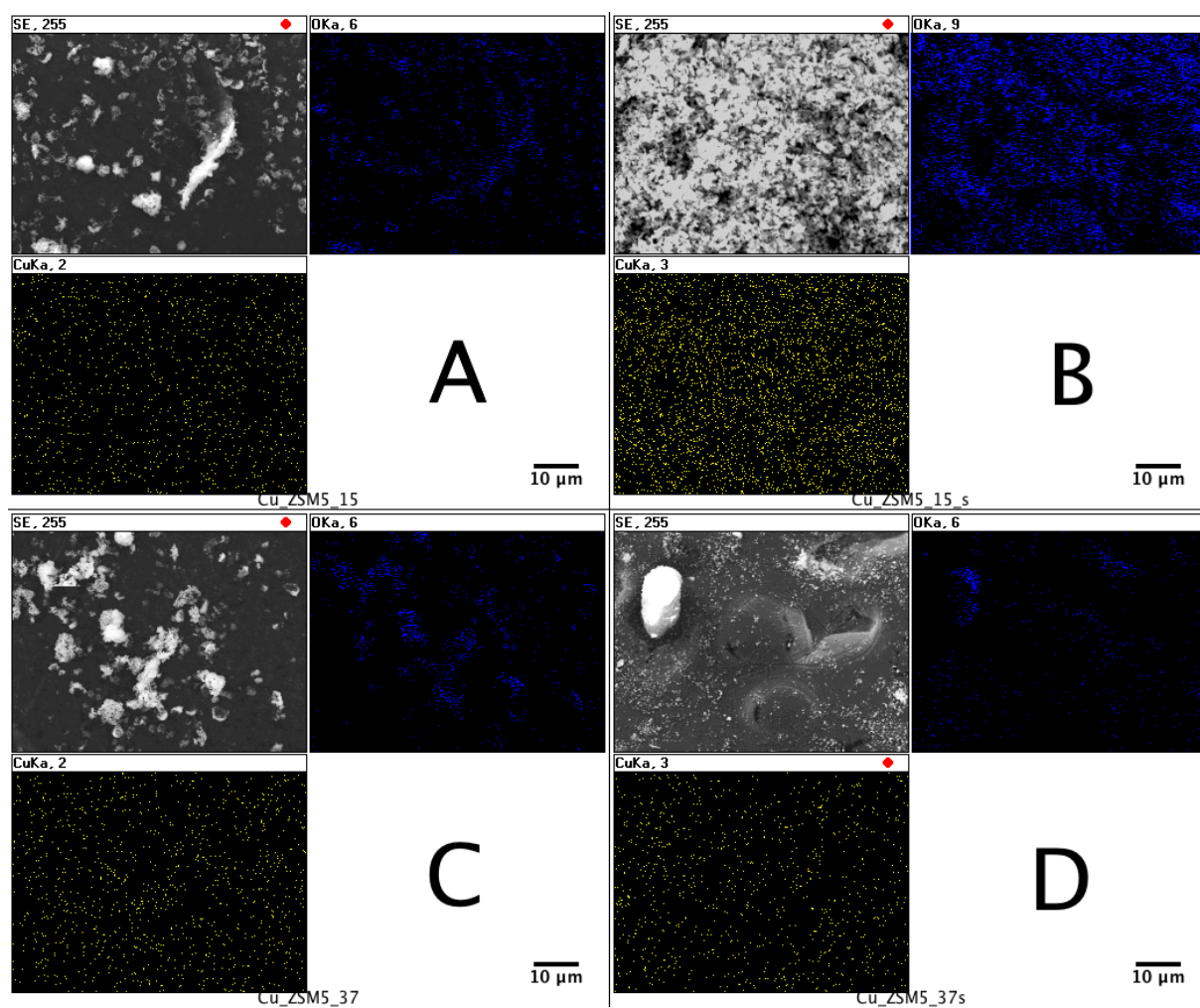


Figure S6. SEM mapping of Cu/ZSM-5 samples; A) Cu/ZSM-5-15, B) Cu/ ZSM-5-15/s, C) Cu/ ZSM-5-37, D) Cu/ ZSM-5-37/s; blue-oxygen, yellow-copper

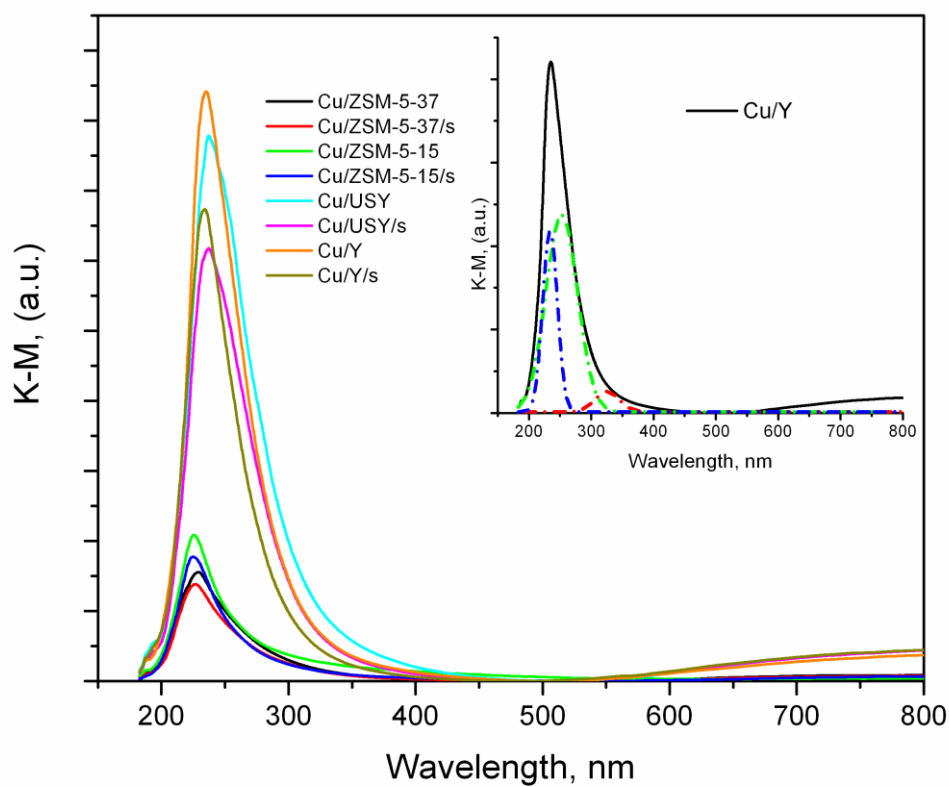


Figure S7. In-situ UV-Vis spectra of prepared samples with exemplary deconvolution of Cu/Y sample (inset)

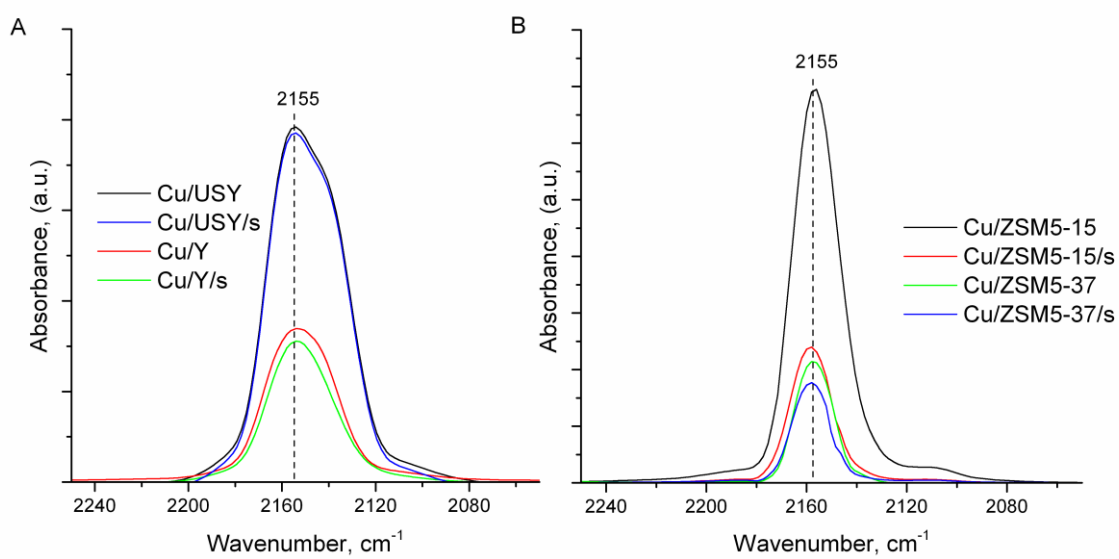


Figure S8. *In situ* FTIR spectra of the zeolite samples with adsorbed CO at room temperature: A) Cu/Y and Cu/USY, B) Cu/ZSM-5-15 Cu/ZSM-5-37

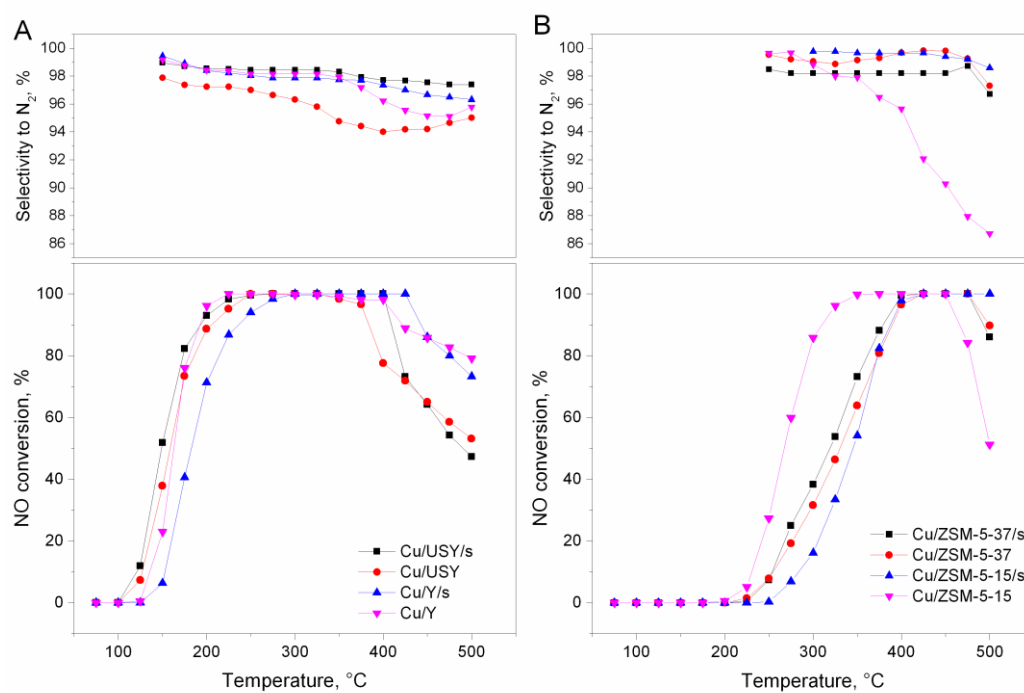


Figure S9. Catalytic activity and selectivity to N_2 : A) Cu/Y and Cu/USY samples, B) Cu/ZSM-5-based samples

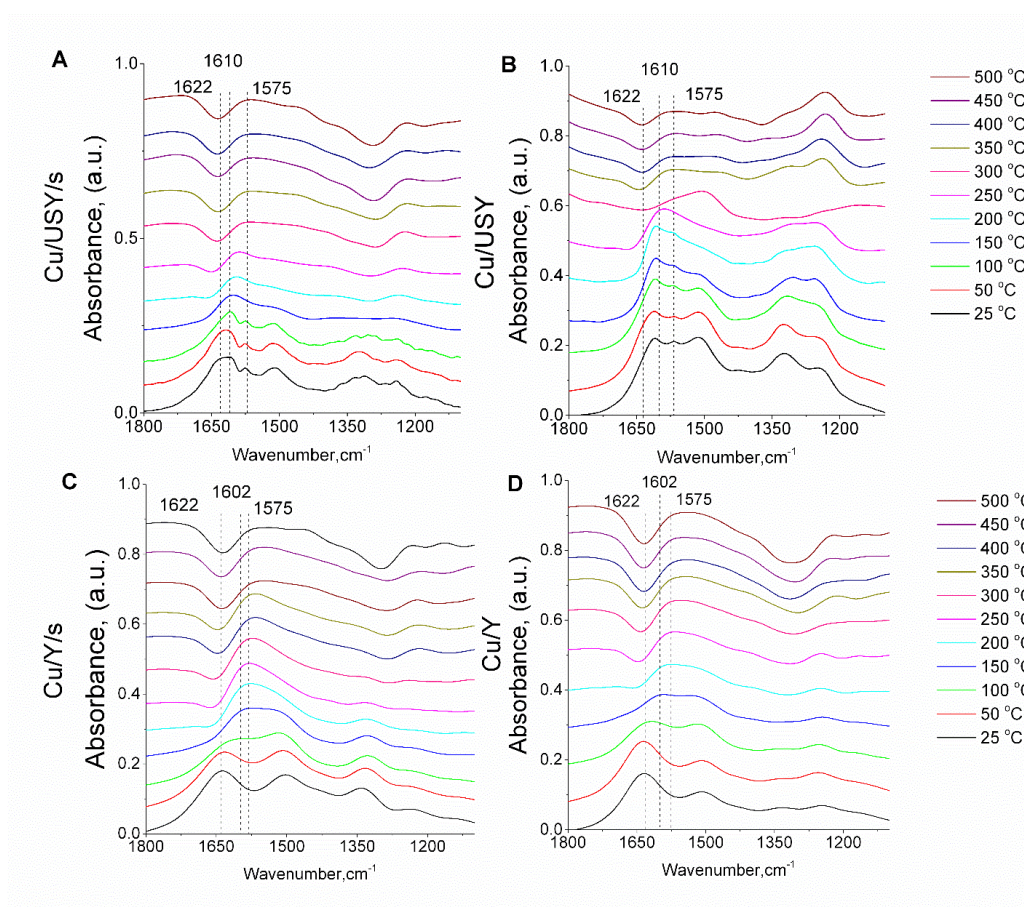


Figure S10. *In situ* DRIFT spectra of NO_x dynamic sorption experiments; A) Cu/USY/s, B) Cu/USY, C) Cu/Y/s, D) Cu/Y.

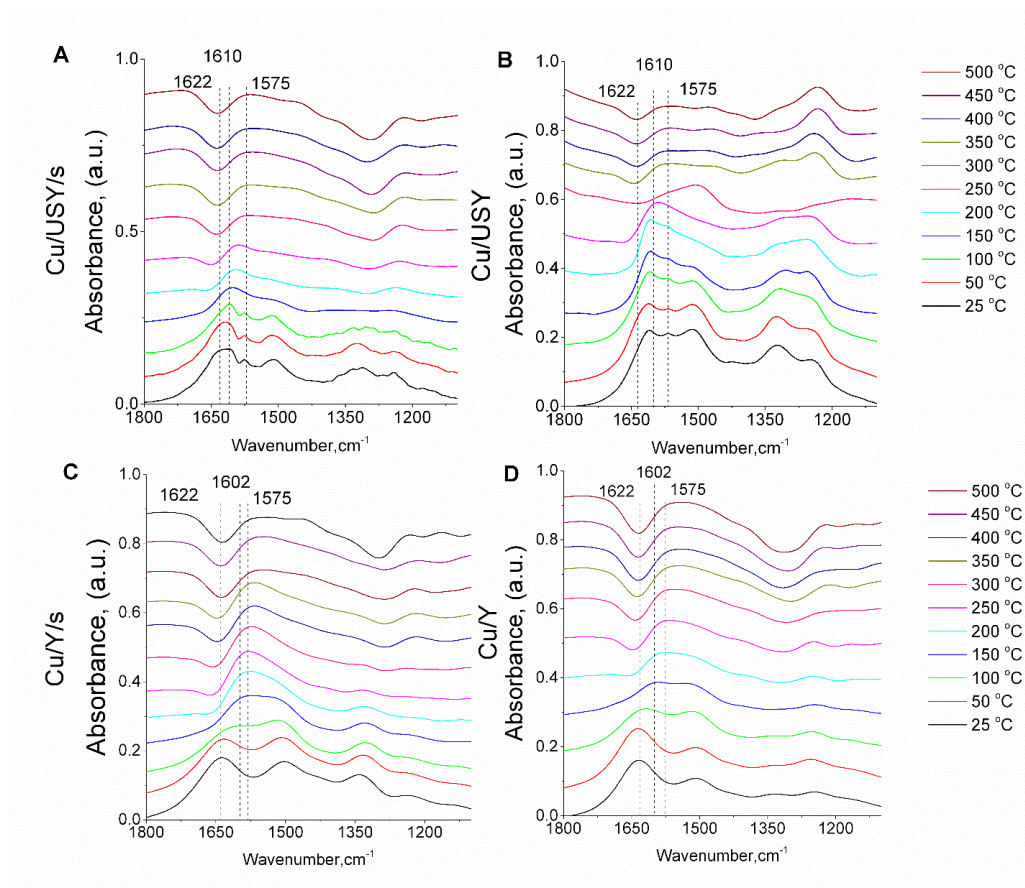


Figure S11. *In situ* DRIFT spectra of NO_x dynamic sorption experiments; A) Cu/ZSM-5-15/s, B) Cu/ZSM-5-15, C) Cu/ZSM-5-37/s, D) Cu/ZSM-5-37

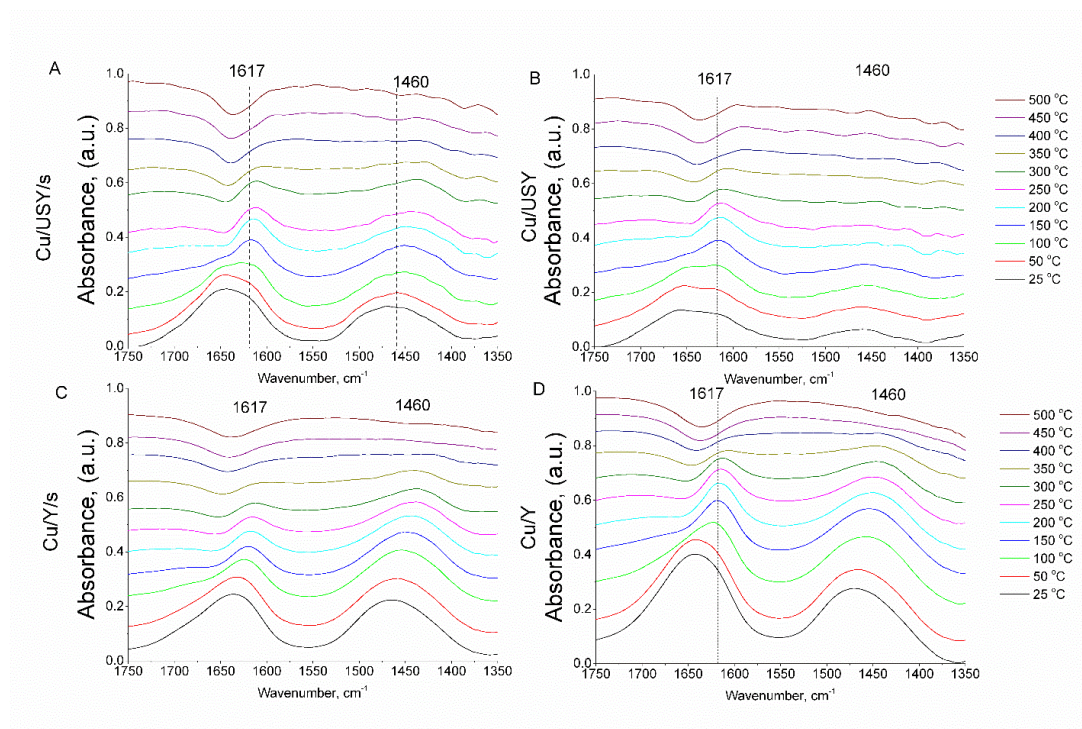


Figure S12. *In situ* DRIFT spectra of NH₃ dynamic sorption experiments; A) Cu/USY/s, B) Cu/USY, C) Cu/Y/s, D) Cu/Y

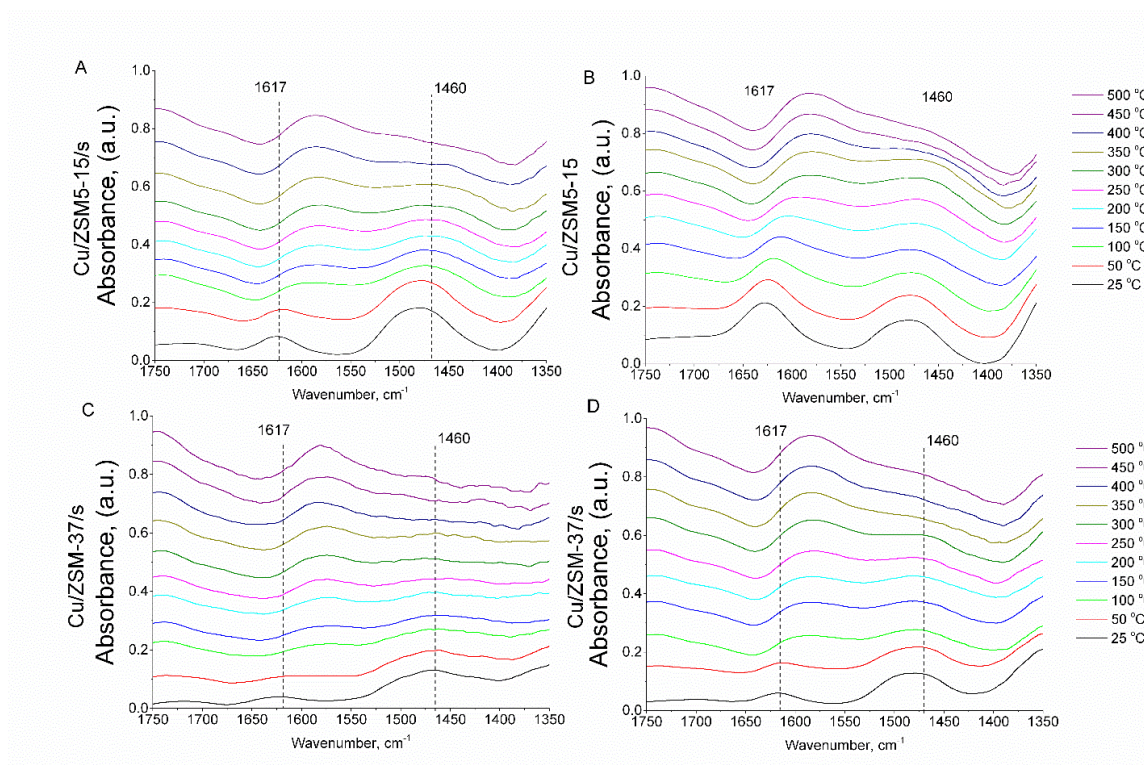


Figure S13. *In situ* DRIFT spectra of NH_3 dynamic sorption experiments; A) Cu/ZSM-5-15/s, B) Cu/ZSM-5-15, C) Cu/ZSM-5-37/s, D) Cu/ZSM-5-37

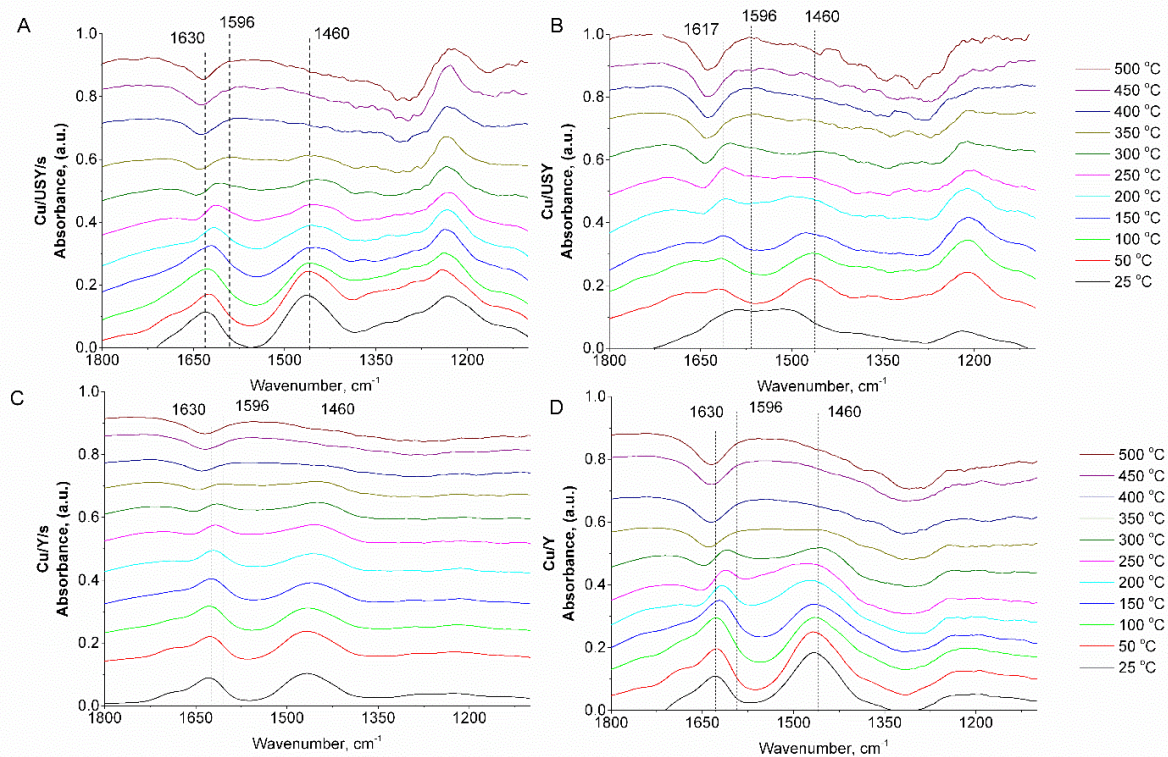


Figure S14. *In situ* DRIFT spectra of SCR deNO_x experiments: A) Cu/USY/s, B) Cu/USY, C) Cu/Y/s, D) Cu/Y

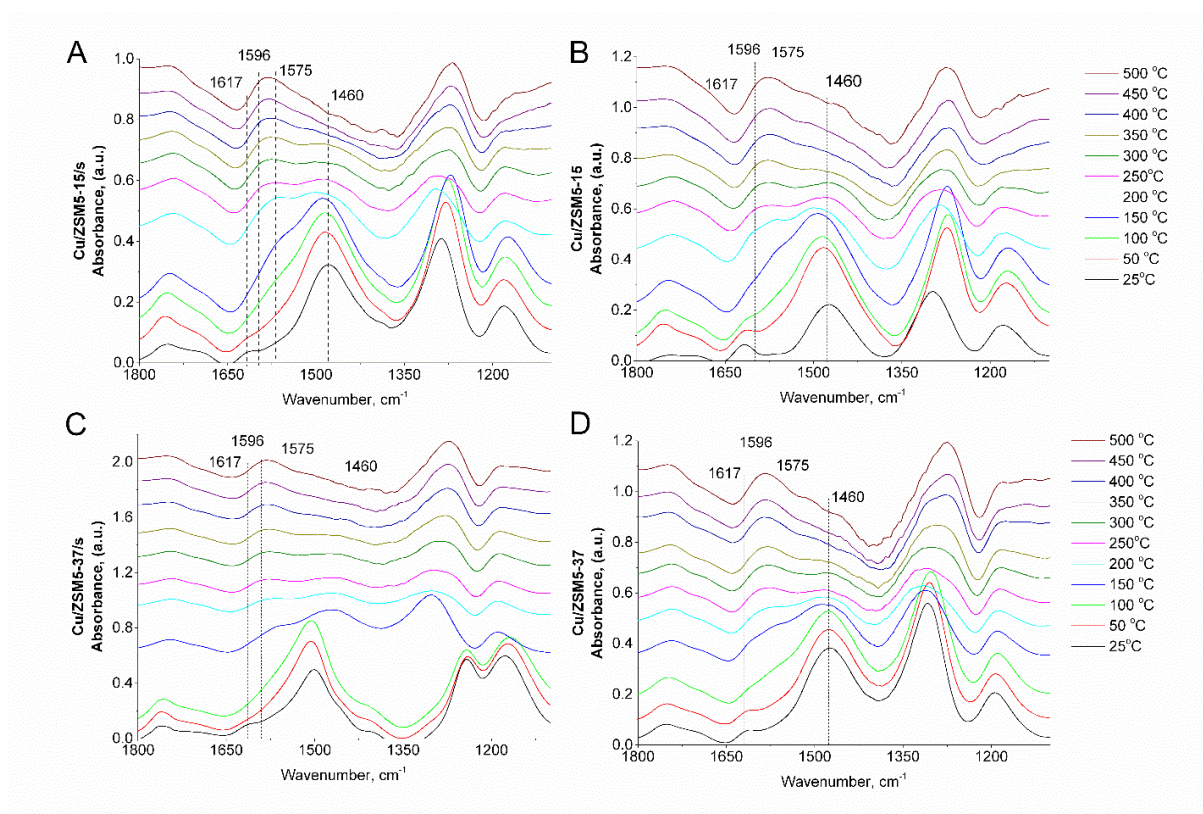


Figure S15. *In-situ* DRIFT spectra of SCR deNO_x experiments; A) Cu/ZSM-5-15/s, B) Cu/ZSM-5-15, C) Cu/ZSM-5-37/s, D) Cu/ZSM-5-37

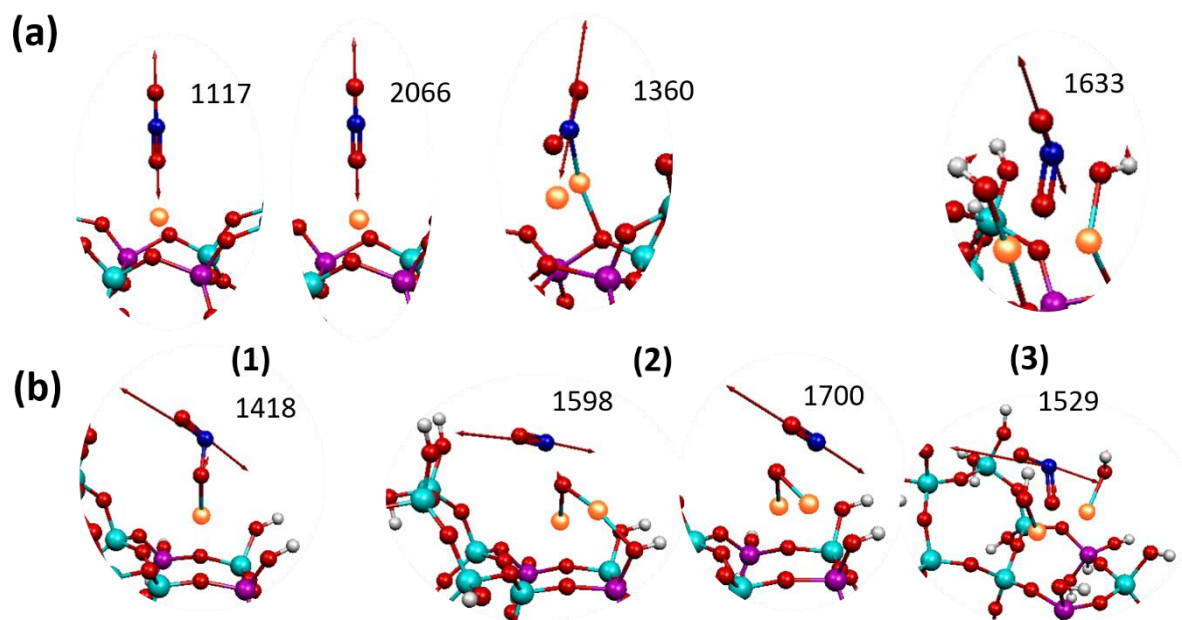


Figure S16. Adsorption of NO on: (a) Y/USY and (b) ZSM-5. (1) CuO monomer, (2) Cu₂O dimer and (3) Cu₂O(OH)₂ hydrated dimer

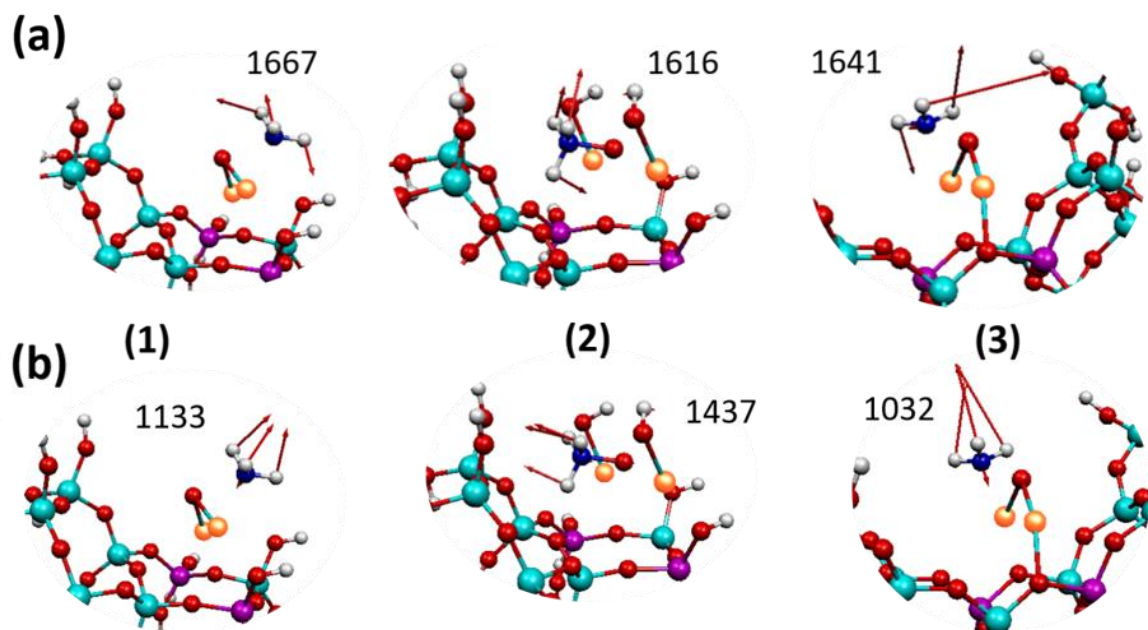


Figure S17. Vibration of NH_3 adsorbed on (a) Y/USY and (b) ZSM-5. (1) Cu_2O dimer and (2) $\text{Cu}_2\text{O}(\text{OH})_2$ hydrated dimer, (3) Cu_2O dimer

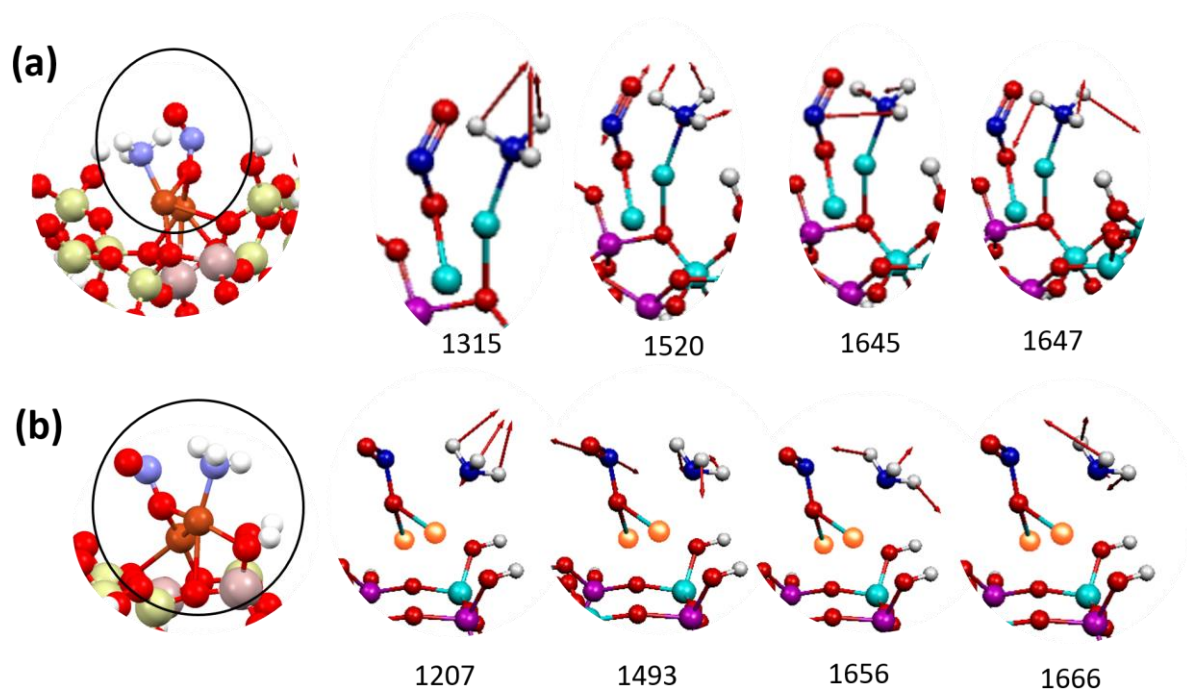


Figure S18. Co-adsorption of NO and NH_3 on Cu_2O dimer over (a) Y/USY and (b) ZSM-5 zeolite