

Purification of Hydrogen from CO with Cu/ZSM-5 Adsorbents

SUPPORTING INFORMATION

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Table S1. Data on the chemical composition of the samples obtained by ICP and photometric analysis.

No	Sample	Al, wt%	Cu, wt%	Cl, wt%
1	6.4CuZ27(SE)	2.74	6.37	1.35
2	9.7CuZ23(SE)	2.95	9.71	1.50
3	3.1CuZ23(AE)	2.92	3.10	-
4	2.3CuZ23(AE)	2.89	2.30	-

Table S2. H₂ consumption in the TPR experiments expressed as H₂:Cu molar ratio with differently pretreated 3.1CuZ23(AE).

Peaks	Pretreated in O ₂ /He	Reduced in CO/He
Peak 1 (193 – 276 °C)	0.51	0.07
Peaks 2 and 3 (383 – 428 °C)	0.46	0.42
Total	0.97	0.49

Table S3. H₂ consumption in the TPR experiments expressed as H₂:Cu molar ratio with differently pretreated 9.7CuZ23(SE).

Peaks	Pretreated in O ₂ /He	Reduced in CO/He
Peak 1 (204 – 236 °C)	0.10	0.03
Peaks 2 and 3 (318 – 393 °C)	0.57	0.57
Total	0.67	0.60

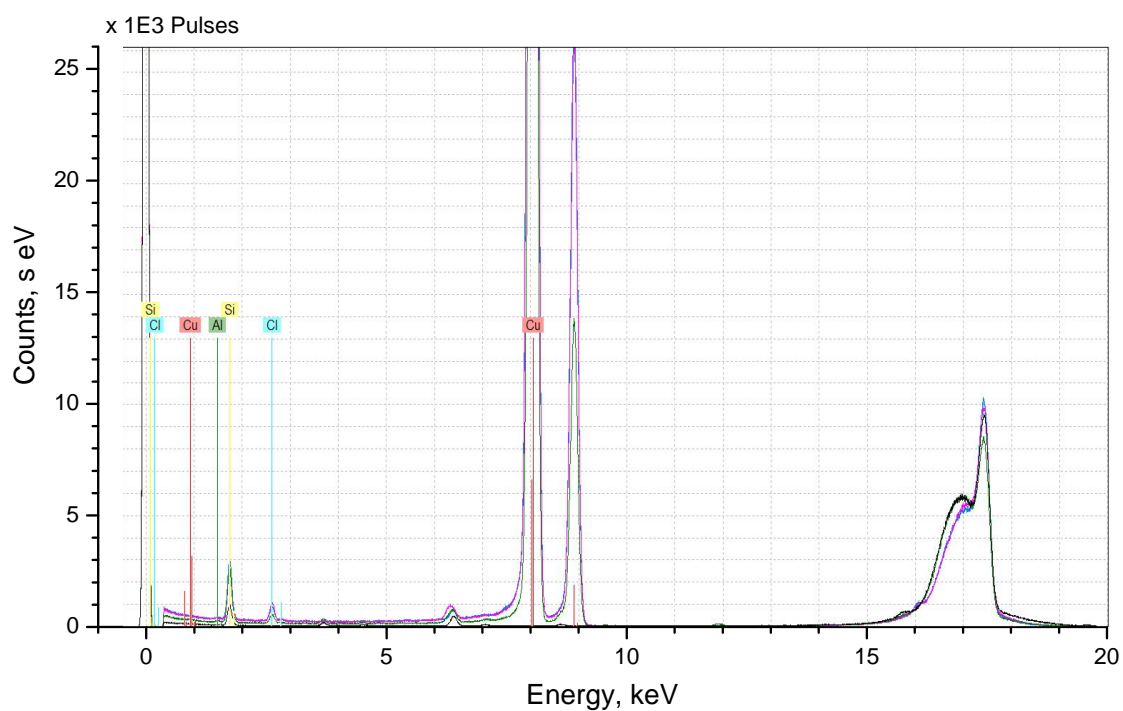


Figure S1. XRF spectra of 6.4CuZ27(SE).

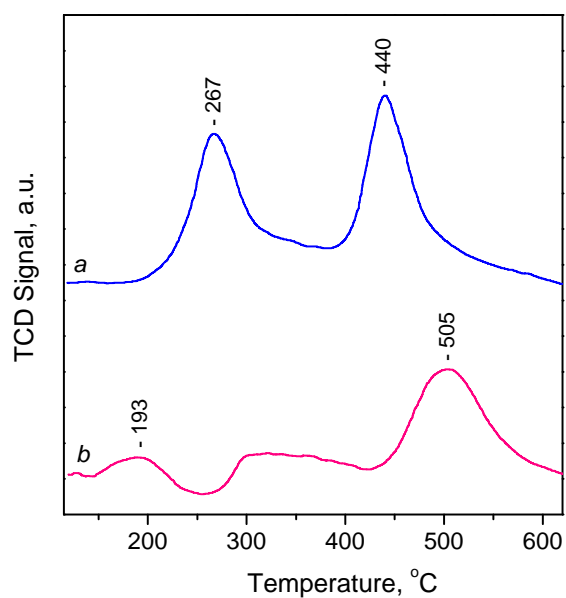


Figure S2. H_2 -TPR profiles of 2.3CuZ23(AE): pretreated in He/O_2 at 500 °C (a) and reduced with He/CO at 300 °C (b).

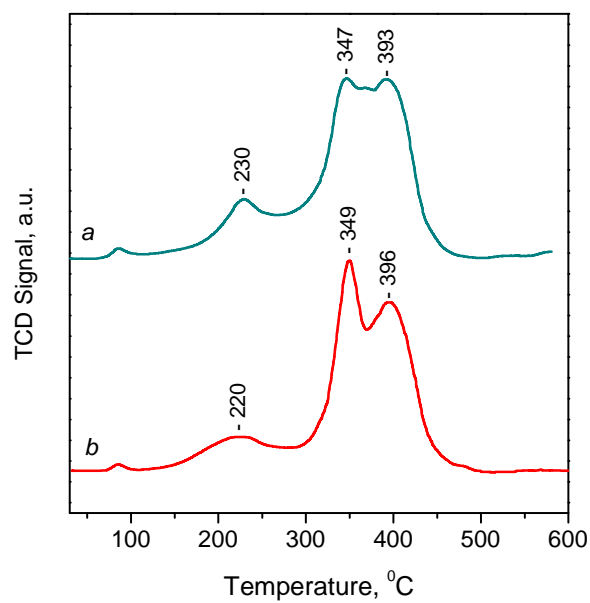


Figure S3. H₂-TPR profiles of 6.4CuZ27(SE): pretreated in He at 500 °C (a) and reduced with He/CO at 300 °C(b).

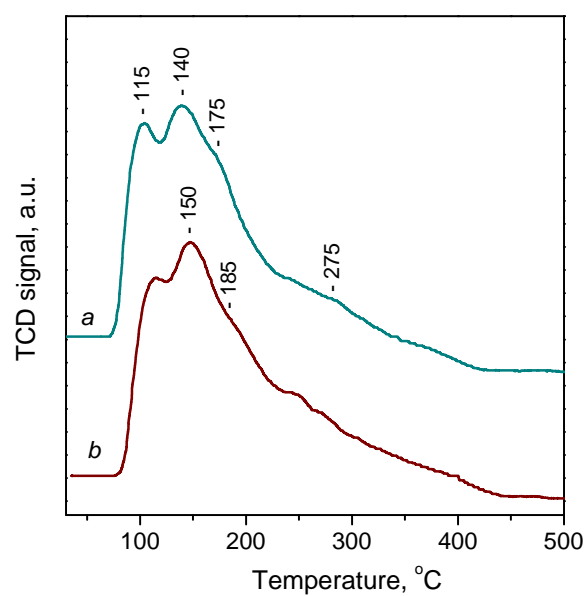


Figure S4. CO-TPD curves of sample 6.4CuZ27(SE) activated in He (a) and reduced with CO (b).

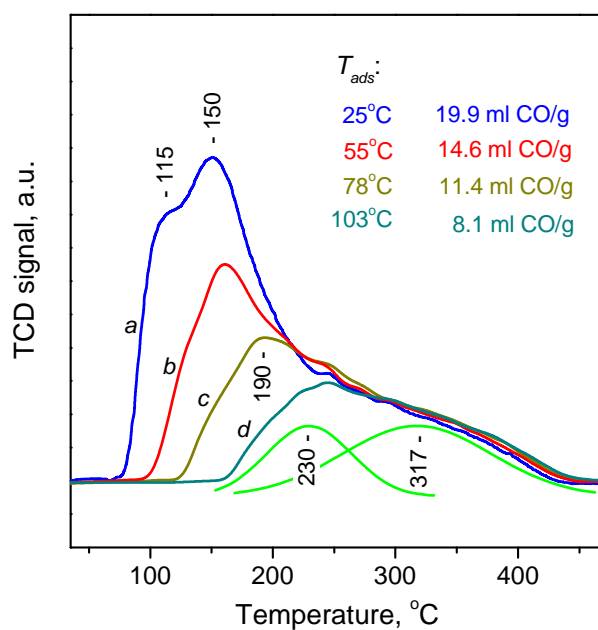


Figure S5. CO-TPD curves obtained after CO adsorption on 9.7CuZ23(SE). The applied T_{ads} : 25 (a), 55 (b), 78 (c) and 103 °C.

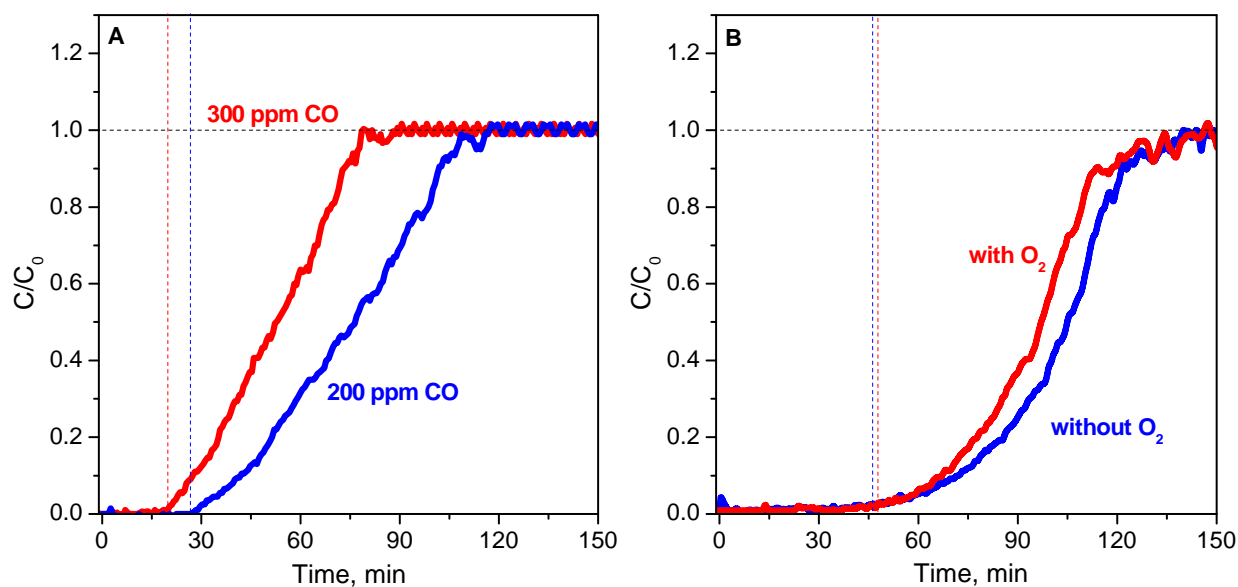


Figure S6. (A) Breakthrough curves of CO on 6.4CuZ27(SE) at different feed gas concentrations of CO, 200 or 300 ppm. (B) Breakthrough curve of CO on 9.7CuZ23(SE), in the absence and presence of 700 ppm O_2 .

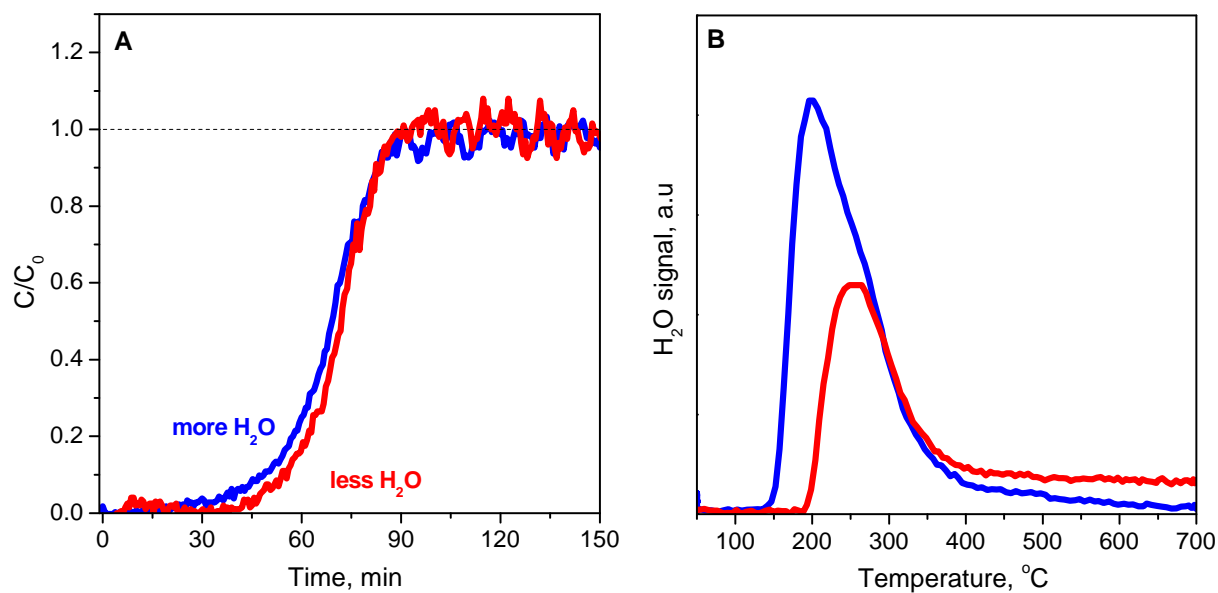


Figure S7. (A) Breakthrough curves of CO on 6.4CuZ27(SE) at different humidity. (B) TPD of water in both caces.

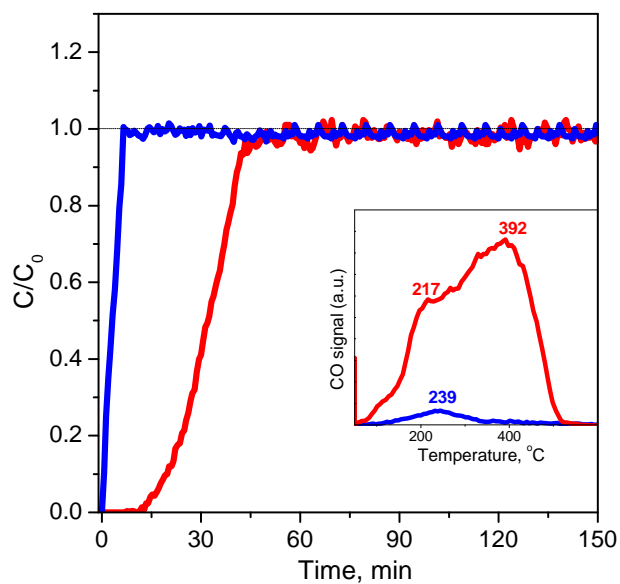


Figure S8. Breakthrough curves of CO on 3.1CuZ23(AE), pre-activated in O₂/Ar (blue) or reduced with CO/Ar (red). The inset shows the respective CO-TPD curves.

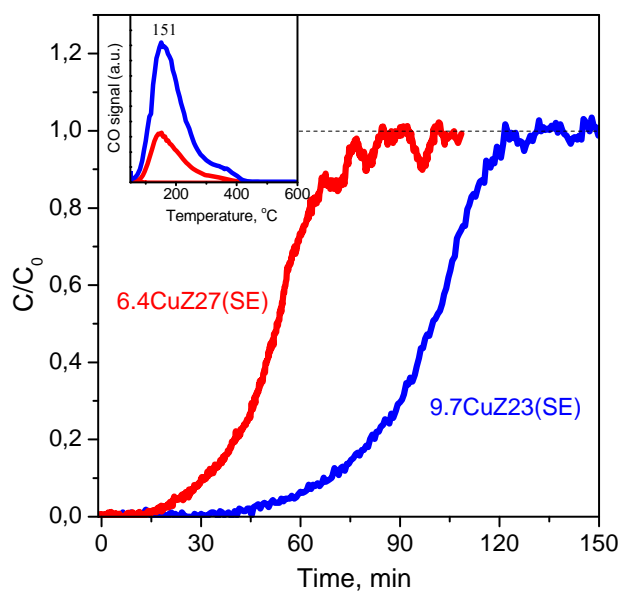


Figure S9. Breakthrough curves of CO on 6.4CuZ27(SE) (red) and 9.7CuZ23(SE) (blue) preactivated in Ar. The inset shows the respective CO-TPD curves.

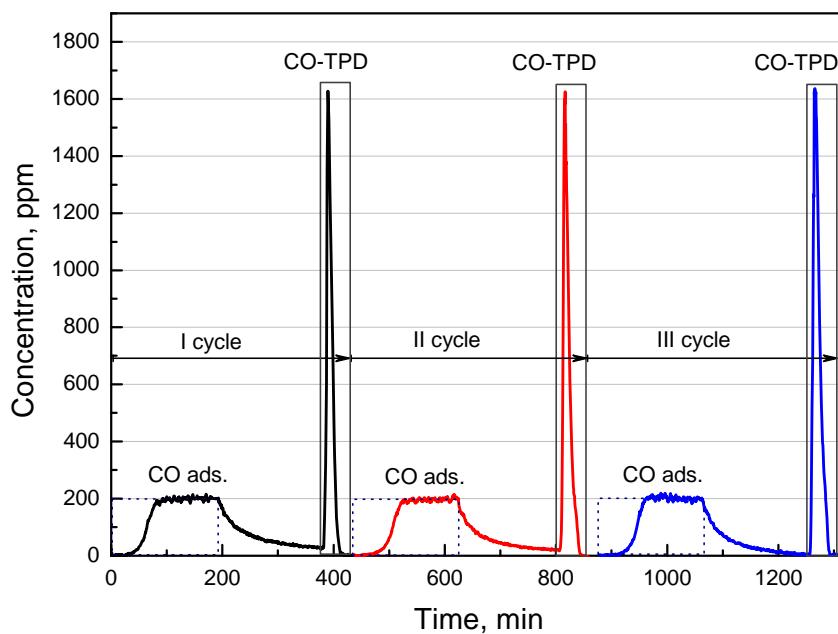


Figure S10. Subsequent cycles of adsorption (breakthrough curve) and desorption (TPD curve) of CO on 9.7CuZ27(SE).