## Supplementary information (SI)

## Regeneration of water-deactivated Cu/SAPO-34(MO) with acids

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## **Supplementary figures**



Figure S1. NH<sub>3</sub>-SCR reaction activity according to the deactivation protocol (see Table S1).



Figure S2. NOx conversion of Cu/SAPO-34(MO) treated with silicic acid.



**Figure S3.** XRD patterns of sample 1, 2, 3, 4, 5, 6, 7, and 8 see Table 1 for details. Sample 1: \*Cu/SAPO-34, sample 2: D-Cu/SAPO-34, sample 3: D-Cu/SAPO-34-R-A2-2, sample 4: D-Cu/SAPO-34-R-Heat, sample 5: D-Cu/SAPO-34-R-S2-2, sample 6: D-Cu/SAPO-34-R-A1-1, sample 7: D-Cu/SAPO-34-R-A0.5-1, sample 8: D-Cu/SAPO-34-R-A2-2-C.



**Figure S4.** H<sub>2</sub>-TPR profiles of all samples, see Table 1 for details. Sample 1: Cu/SAPO-34, Sample 2: D-Cu/SAPO-34, Sample 3: D-Cu/SAPO-34-R-A2-2, Sample 4: D-Cu/SAPO-34-R-Heat, Sample 5: D-Cu/SAPO-34-R-S2-2, Sample 6: D-Cu/SAPO-34-R-A1-1, Sample 7: D-Cu/SAPO-34-R-A0.5-1, and Sample 8: D-Cu/SAPO-34-R-A2-2-C. Note the difference between Sample 3, which has been exposed to multiple SCR experiments after regeneration and Sample 8, which is directly after regeneration and used for characterization (C) only.

## Supplementary tables

Series of experimental plans	Pre-treatment	Temperature protocol (°C)	
Fresh	8% O <sub>2</sub> , 400 ppm NH <sub>3</sub> , 400 ppm NO, 5% H <sub>2</sub> O at 750°C for 30 min	150, 200, 250, 300, 400, 500	
Deactivation 1 (D-1)	8% O <sub>2</sub> , 7.5% H <sub>2</sub> O at 70°C for 5 hr	150, 200, 250	
Deactivation 2 (D-2)	$8\%~O_2,7.5\%~H_2O$ at $70^\circ C$ for 5 hr	150, 200, 250	
Deactivation 3 (D-3)	$8\%~O_2,7.5\%~H_2O$ at $70^\circ C$ for 5 hr	150, 200, 250	

Table S1. Deactivation protocol: pre-treatment conditions and reaction temperatures for NH<sub>3</sub>-SCR.

**Table S2.** BET micropore surface area and micropore volume.

Catalyst	$S_{BET}\left(m^2\!/g\right)$	Micropore volume $(cm^3/g)^*$
Sample 1	519	0.17
Sample 2	484	0.21
Sample 3	398	0.23
Sample 4	469	0.21
Sample 5	473	0.15
Sample 6	484	0.18
Sample 7	499	0.20
Sample 8	367	0.17

\*Volume of liquid nitrogen condensed at the low  $P/P0 \approx 0.01$ 

**Table S3.** Chemical composition of all samples determined by ICP-SFMS. Note that the analysis is made on crushed monoliths, which also contain Si and Al and therefore are Si and Al not shown.

Element	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8
P (wt.%)	0.93	1.08	1.06	1.31	1.29	1.15	1.44	0.84
Cu (wt.%)	0.15	0.18	0.18	0.20	0.21	0.18	0.21	0.15

Table S4. Distribution (%) of Al coordination obtained from deconvoluted <sup>27</sup>Al DP MAS NMR spectra

	Al(IV)	Al(V)	Al(VI)
Sample 1	52.9	12.4	34.5
Sample 2	60.0	13.9	25.9
Sample 3	60.6	13.7	25.5
Sample 4	61.2	13.3	25.3
Sample 5	59.5	13.9	26.4
Sample 6	62.6	13.6	23.7
Sample 7	63.4	13.9	22.6
Sample 8	60.8	14.3	24.7