

# **The effect of crystallite size on low-temperature hydrothermal stability of Cu-SAPO-34**

*Jinpeng Du<sup>a,c</sup>, Xiaoyan Shi<sup>a,c\*</sup>, Yulong Shan<sup>a,c</sup>, Yingjie Wang<sup>a,c</sup>, Wenshuo Zhang<sup>a,c</sup>,  
Yunbo Yu<sup>a,b,c</sup>, Wenpo Shan<sup>b\*</sup>, Hong He<sup>a,b,c</sup>*

<sup>a</sup> State Key Joint Laboratory of Environment Simulation and Pollution Control,  
Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences,  
Beijing 100085, China.

<sup>b</sup> Center for Excellence in Regional Atmospheric Environment, Institute of Urban  
Environment, Chinese Academy of Sciences, Xiamen 361021, China.

<sup>c</sup> University of Chinese Academy of Sciences, Beijing 100049, China.

Includes 8 pages, 5 figures, 3 tables.

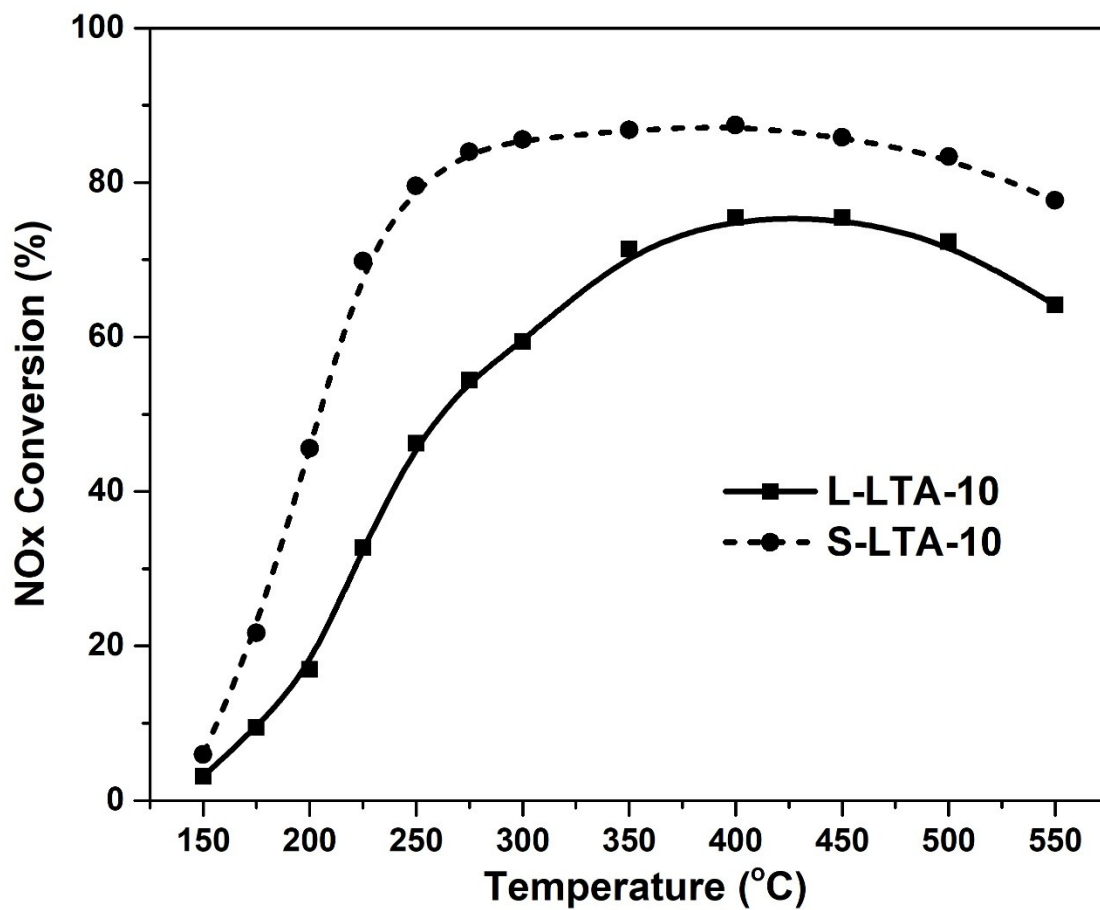


Figure S1. NH<sub>3</sub>-SCR activities of Cu-SAPO-34 with large and small particle sizes after low-temperature hydrothermal treatment for 10 h.

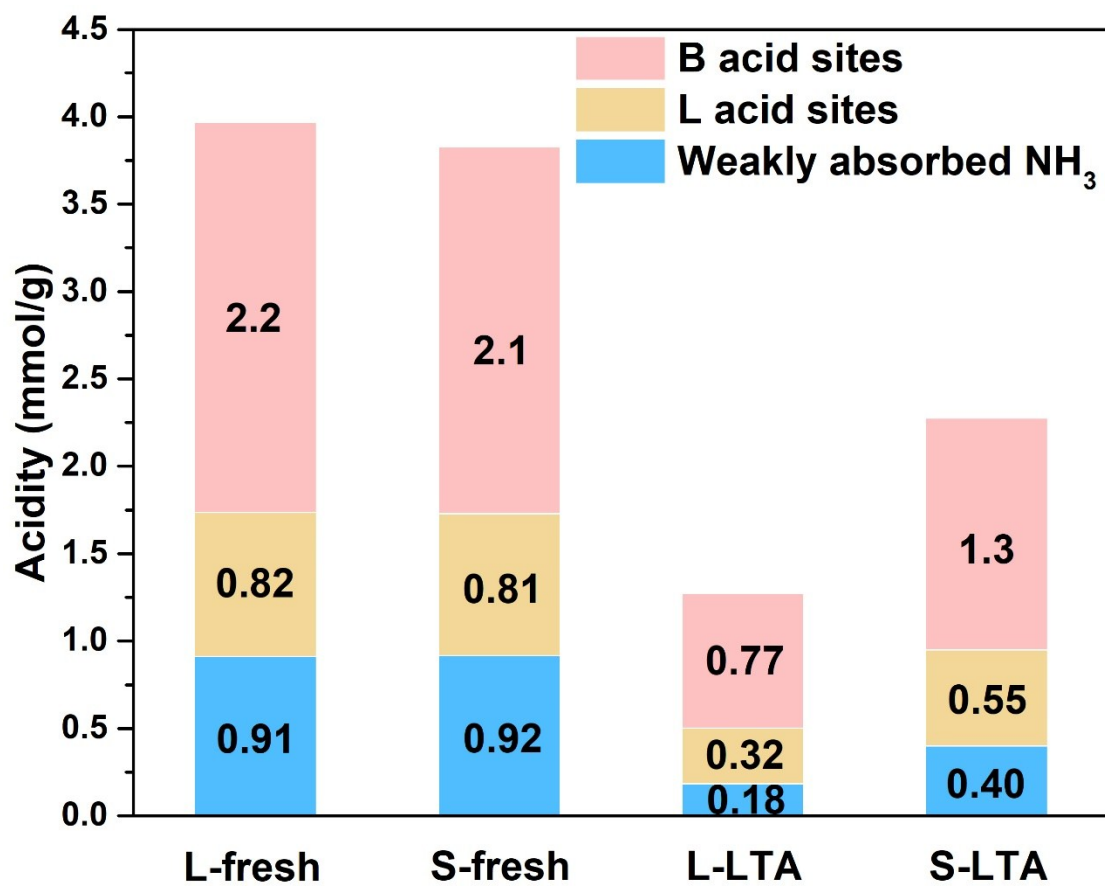


Figure S2. Integrated NH<sub>3</sub> desorption amounts from NH<sub>3</sub>-TPD results.

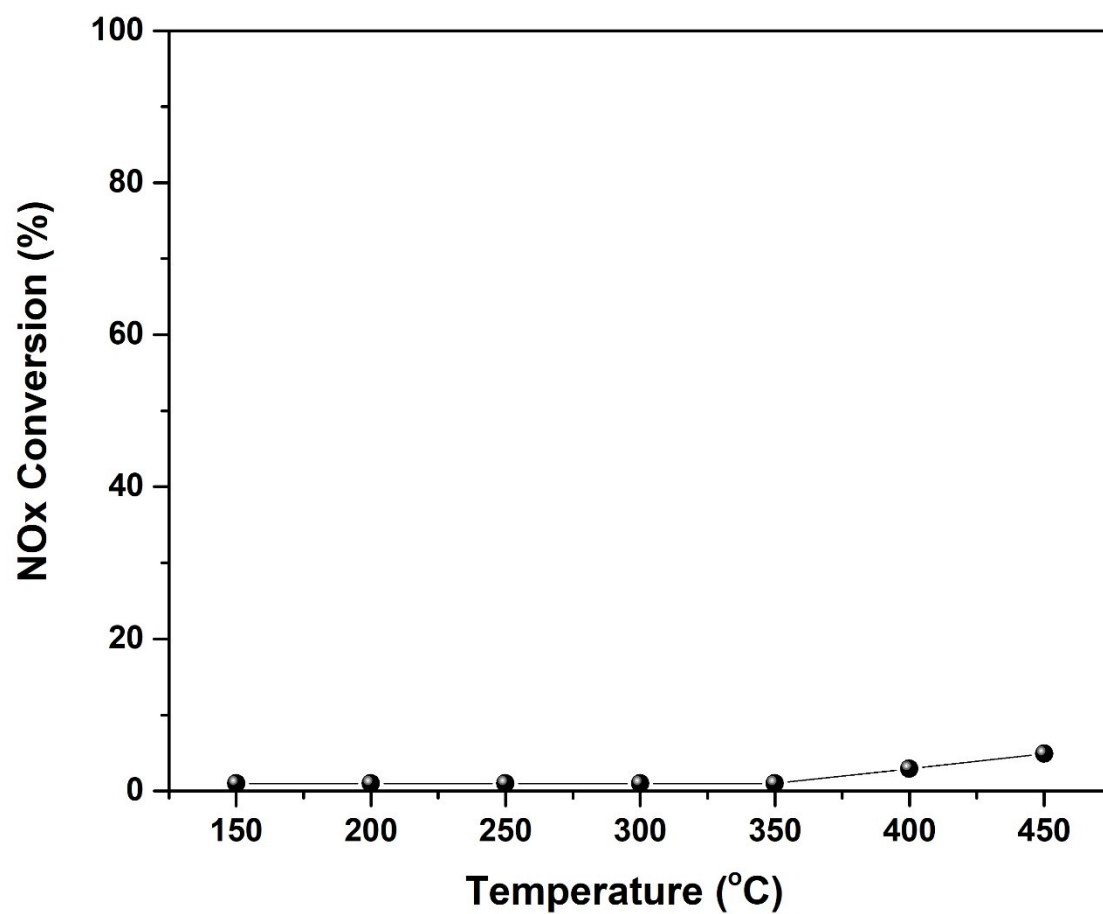


Figure S3. NH<sub>3</sub>-SCR activity of CuAl<sub>2</sub>O<sub>4</sub> (obtained by calcinating the mixture of CuO and Al<sub>2</sub>O<sub>3</sub> at 1000 °C for 2h).

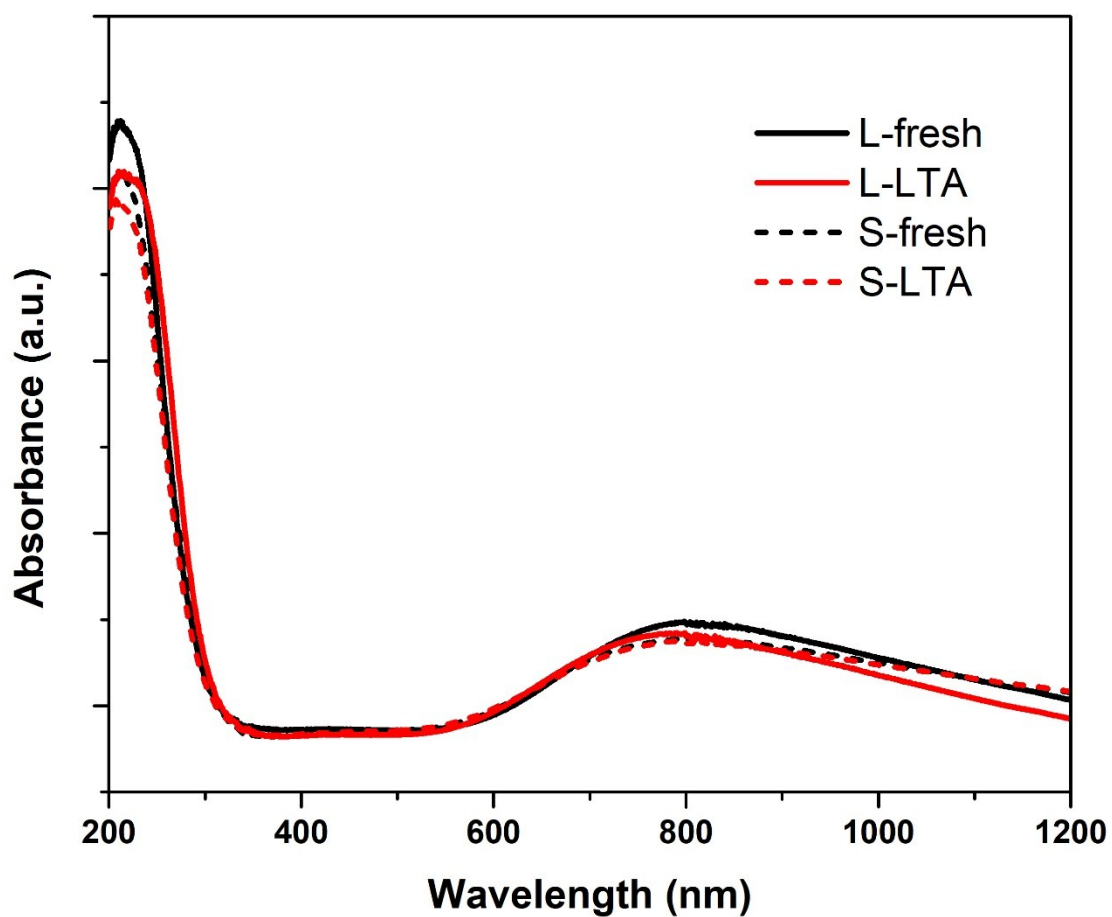
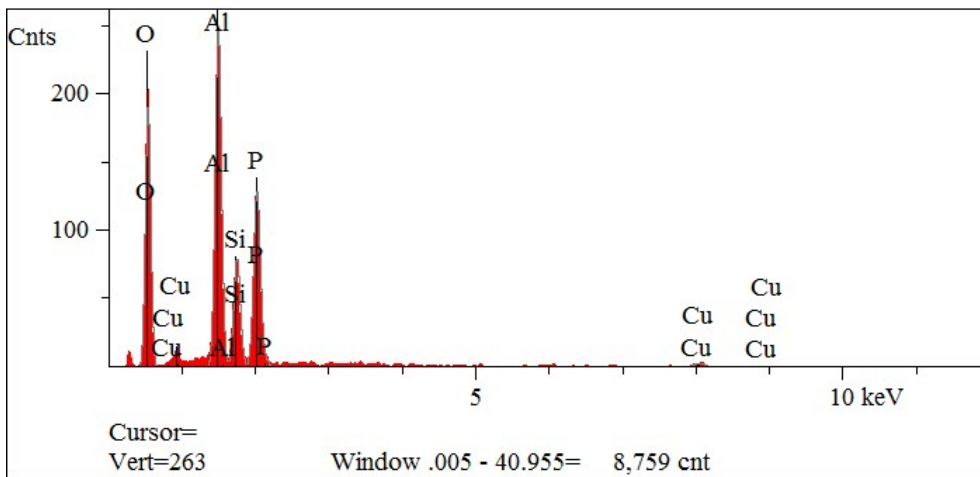
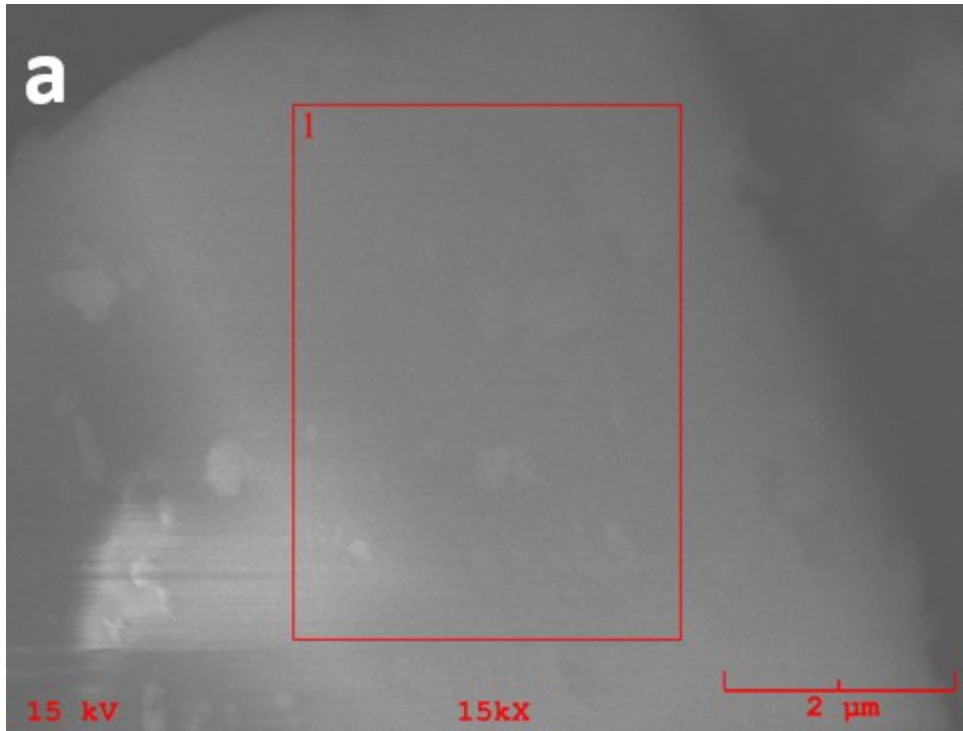


Figure S4. UV-vis spectra of fresh and hydrothermally aged catalysts.

Ultraviolet visible diffuse reflectance spectroscopy (UV-vis-DRS) was carried out on a Varian Cary 5000 spectrometer at room temperature with scanning range from 200 nm to 1200 nm.



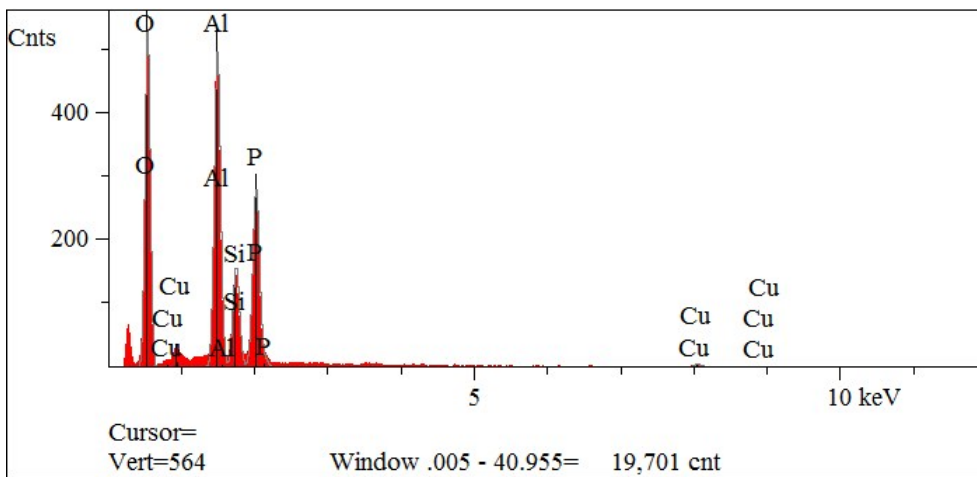


Figure S5. SEM-EDS images of (a) L-fresh (b) S-fresh.

Table S1. Deconvoluted peaks of  $^{29}\text{Si}$  NMR results of Cu-SAPO-34 with large and small particle sizes for fresh and LTA catalysts.

	Si(4Al)/%	Si(3Al)/%	Si(2Al)/%	Si(1Al)/%	Si(0Al)/%
L-fresh	75.0	5.7	5.8	6.2	7.3
L-LTA	68.3	15.6	6.2	5.5	4.3
S-fresh	75.3	6.4	8.2	6.8	3.3
S-LTA	62.5	17.5	8.6	5.8	5.6

Table S2. Surface area and pore volume of Cu-SAPO-34 with different particle sizes.

	L-fresh	L-LTA	S-fresh	S-LTA
Area ( $\text{m}^2/\text{g}$ )	459.6	134.9	462.2	181.6
pore volume ( $\text{cm}^3/\text{g}$ )	0.239	0.089	0.249	0.1

Table S3. Atomic composition of Cu-SAPO-34 with different crystallite sizes (results derived from SEM-EDS).

Atomic/%	O	Al	Si	P	Cu
L-fresh	57.8	20.2	7.7	12.6	1.8
L-LTA	63.4	17.4	7.1	11.2	0.8
S-fresh	63.5	17.4	6.4	11.6	1.1
S-LTA	68.6	15	6.3	9.5	0.6