Supporting Information

Hollow nanocrystals of silicoaluminophosphate molecular sieve synthesized by an aminothermal co-templating strategy

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Table S1. Interaction energies for the SDA in different cavities. (The calculation is based on a unit cell, which includes two different *gme* (*gme*1 and *gme*2) and two different *aft* cages (*aft*1 and *aft*2)

	$E_{\text{interaction energy}}$ (kcal/mol)
One TMA in a *gme*1 cavity and One TMA in a *gme*2 cavity	-30.18
Two TMAs in a *gme*1 cavity and Two TMAs in a *gme*2 cavity	247.37
One TMA in a *aft*1 cavity and One TMA in a *aft*2 cavity	-29.18
One TEA in a *aft*1 cavity and One TEA in a *aft*2 cavity	-53.18
Two TEAs in a *aft*1 cavity and Two TEAs in a *aft*2 cavity	-103.2
Three TEAs in a *aft*1 cavity and Three TEAs in a *aft*2 cavity	2424.11

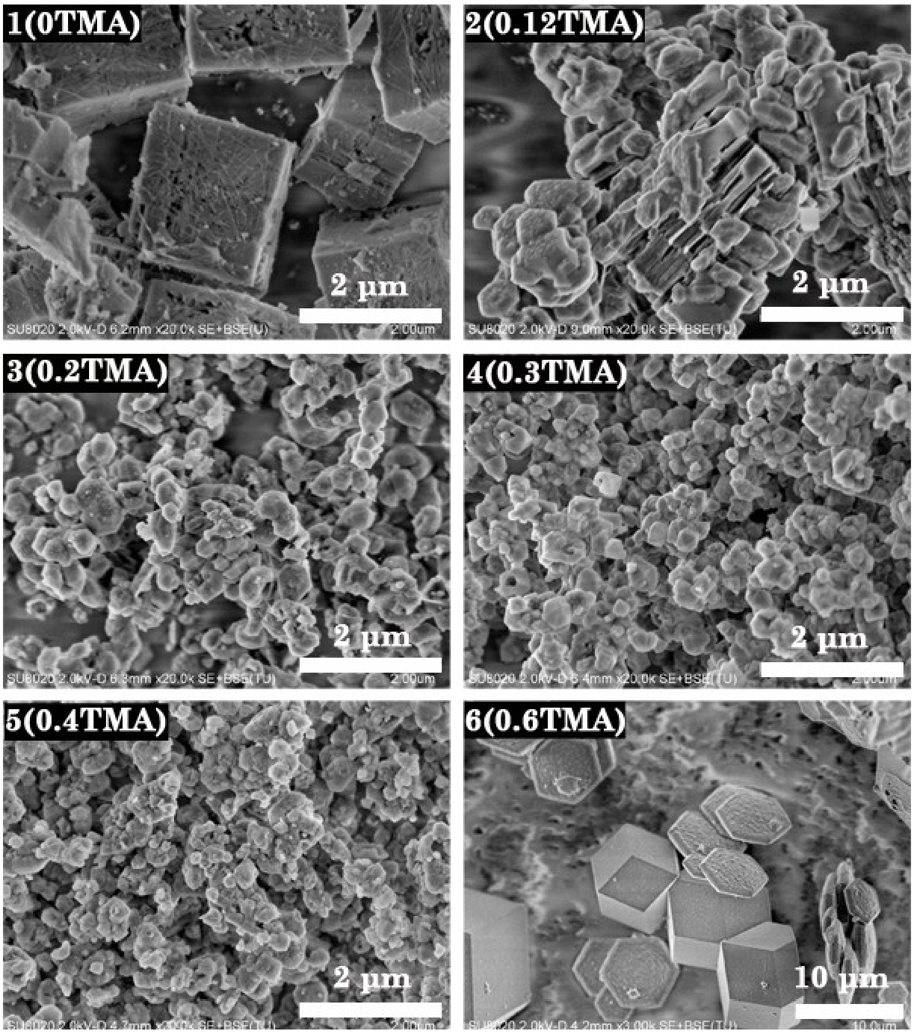
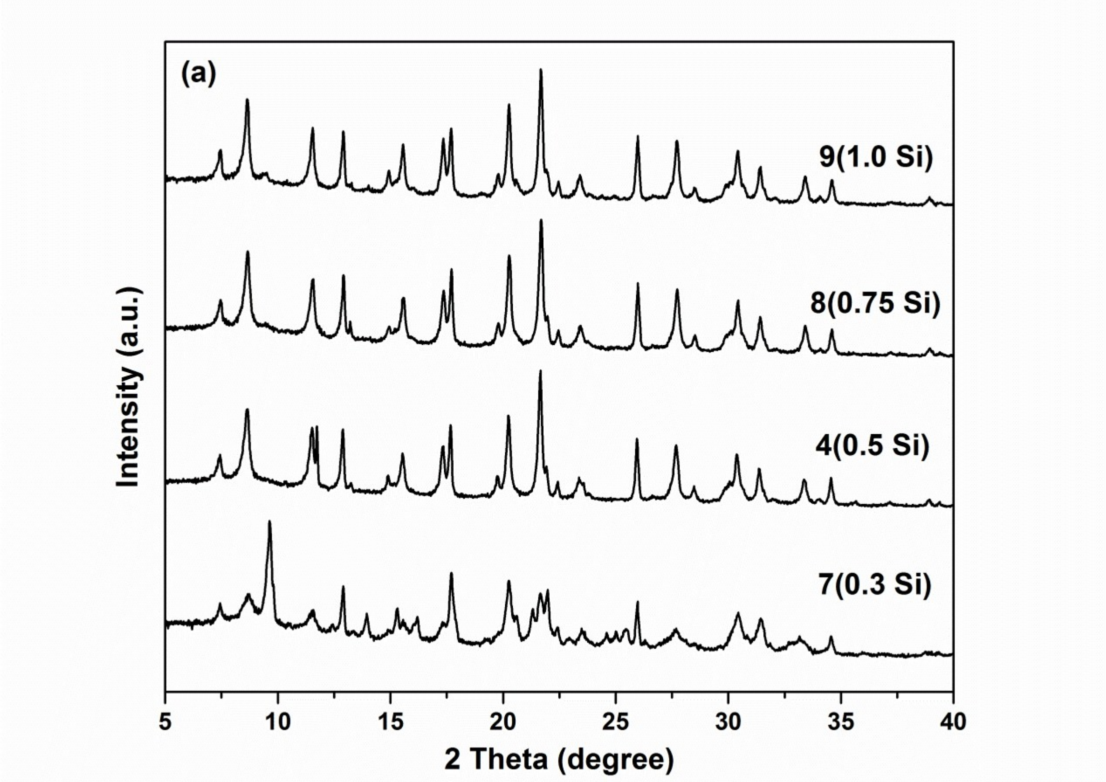
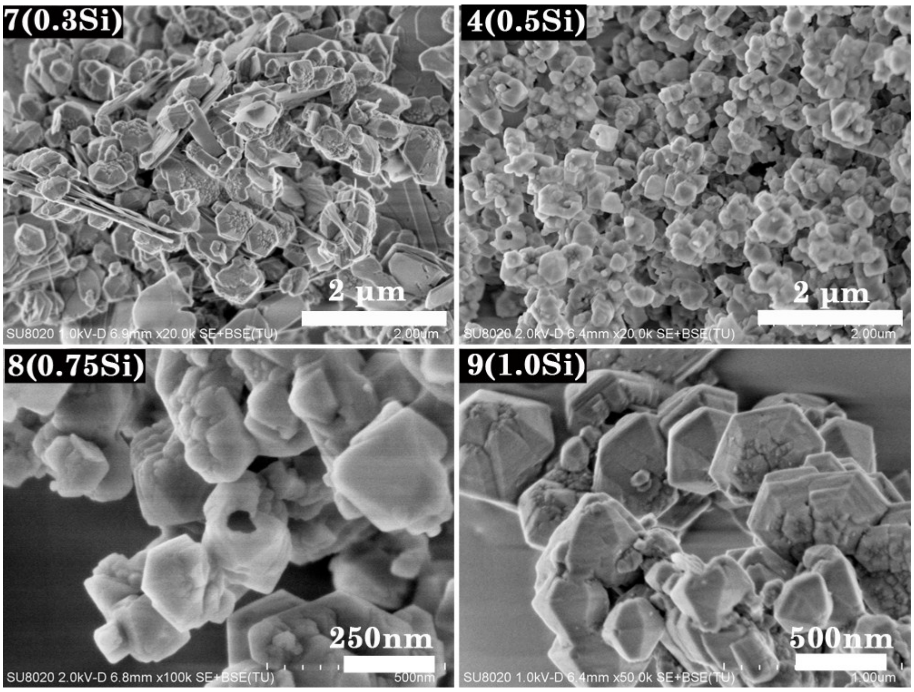


Fig. S1 SEM images of the calcined samples 1 (0TMA), 2 (0.12TMA), 3 (0.2TMA), 4 (0.3TMA), 5 (0.4TMA) and 6 (0.6TMA).


(a)
9(1.0 Si)
8(0.75 Si)
4(0.5 Si)
7(0.3 Si)
Intensity (a.u.)
2 Theta (degree)
5
10
15
20
25
30
35
40


7(0.3Si)
2 μm
SU8020 1.0kV-D 6.9mm x20.0k SE+BSE(TU)
2.00um
4(0.5Si)
2 μm
SU8020 2.0kV-D 6.4mm x20.0k SE+BSE(TU)
2.00um
8(0.75Si)
250nm
SU8020 2.0kV-D 6.8mm x100k SE+BSE(TU)
500nm
9(1.0Si)
500nm
SU8020 1.0kV-D 6.4mm x50.0k SE+BSE(TU)
1.00um

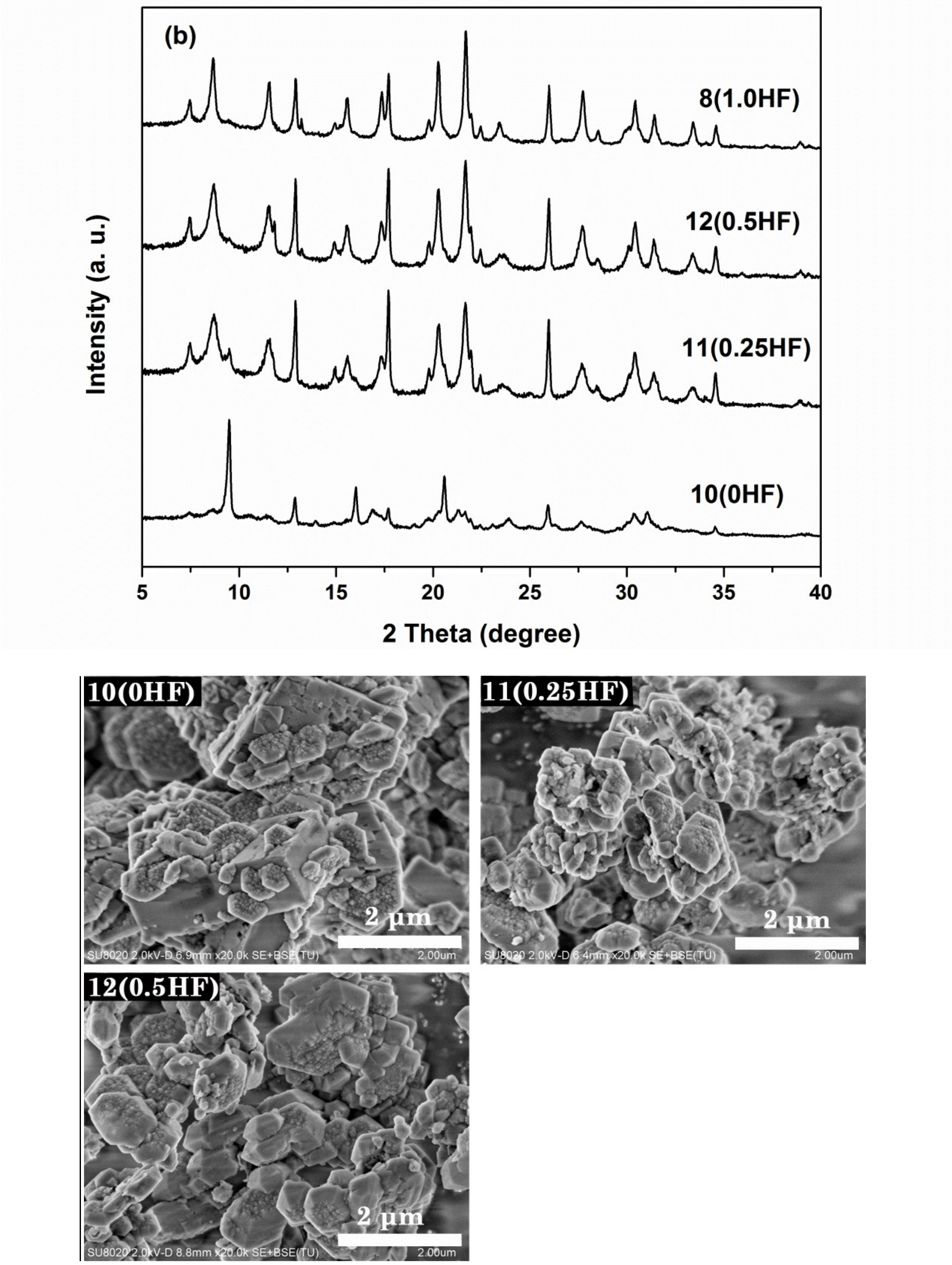


Fig. S2 XRD patterns of the as-synthesized samples 7 (0.3Si), 4 (0.5Si), 8 (0.75Si), 9 (1.0Si), 10 (0HF), 11 (0.25HF) and 12 (0.5HF) and their corresponding SEM images of the calcined form.

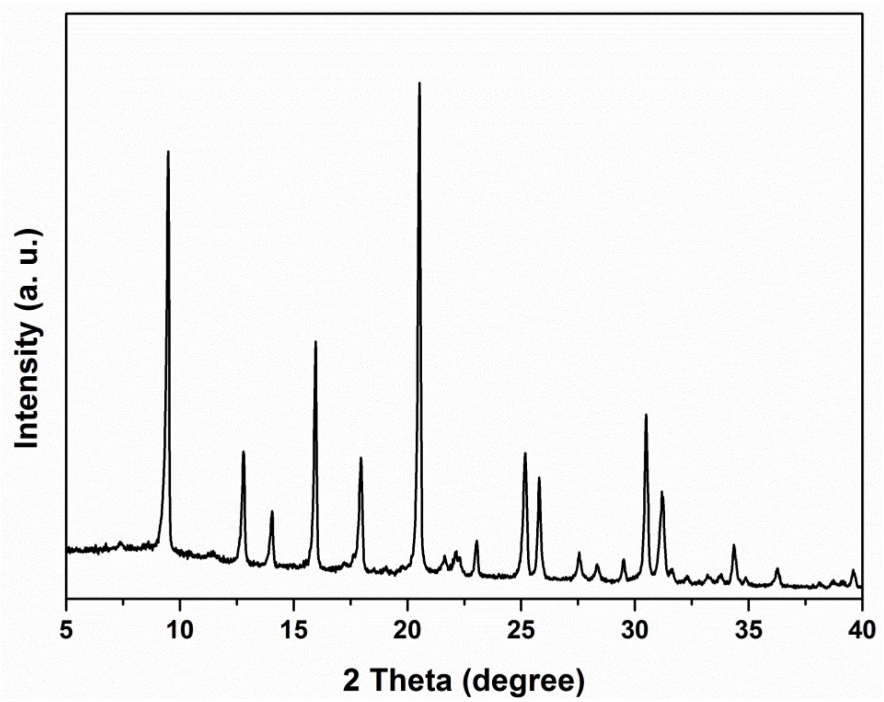


Fig. S3 The XRD pattern of the as-synthesized sample by the route of hydrothermal synthesis (Condition: the gel molar composition of 7TEA/1Al_2O_3/1P_2O_5/0.75SiO_2/0.3TMA/1.0HF/50H_2O at 200 ^{o}C for 36 h).

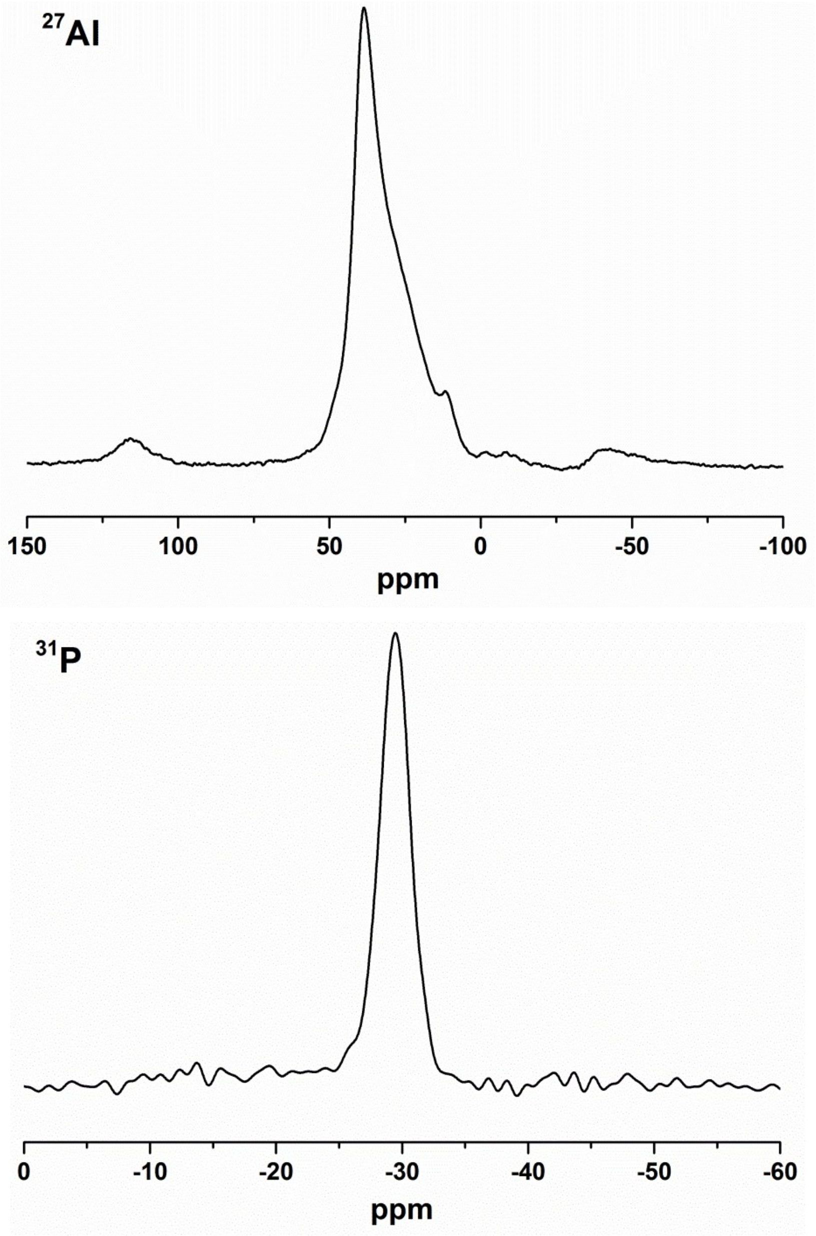


Fig. S4 ^{27}Al and ^{31}P MAS NMR of the as-synthesized SAPO-56 (sample 8).

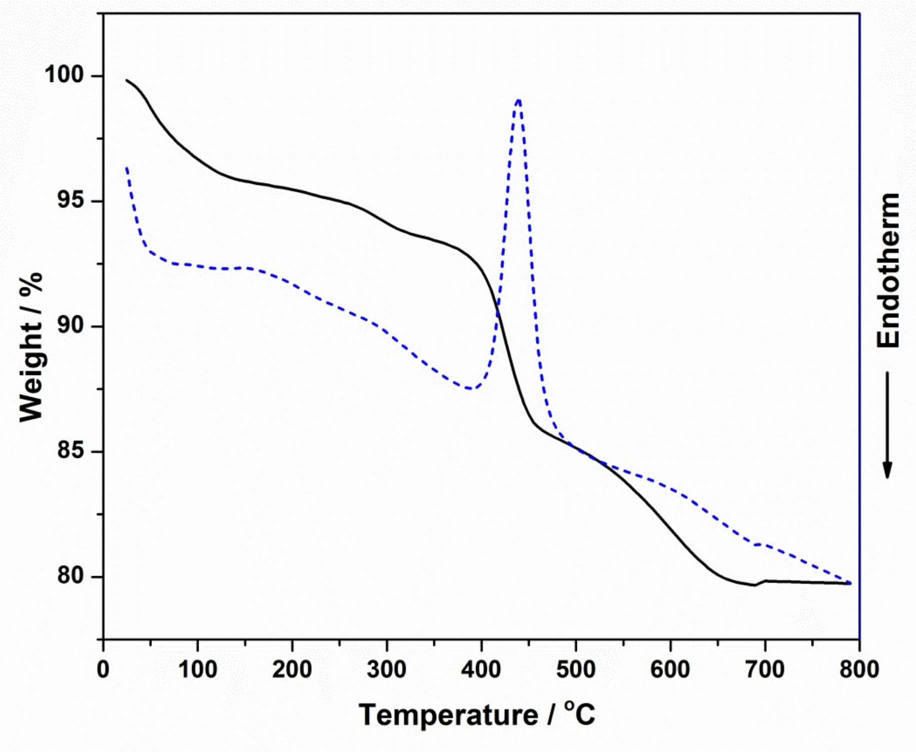


Fig. S5 TG (solid)-DSC (dotted) curves of the sample 8.

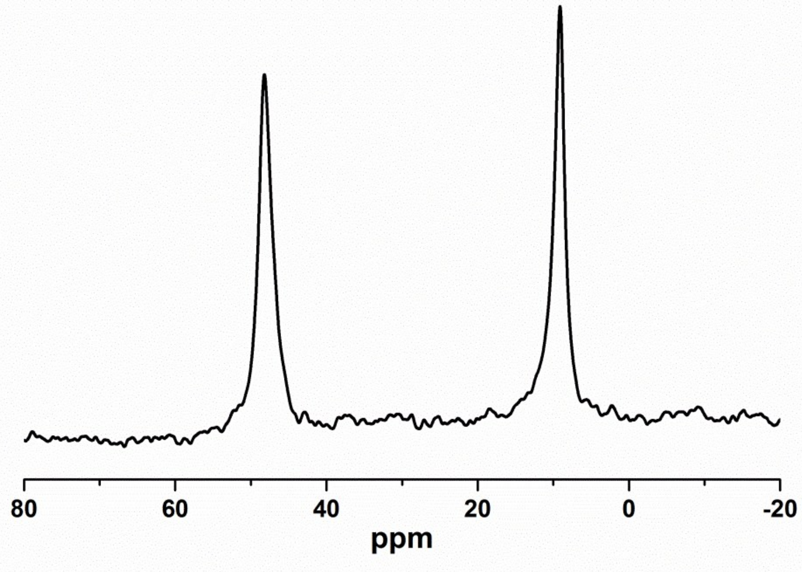


Fig. S6 ^{13}C MAS NMR spectrum of the SAPO-34 (sample 2.33h). The two peaks are integrated and their ratio is close to 1/1, suggesting that the inclusion in SAPO-34 is only TEA. The peak centered at 48 and 9.5 ppm can be ascribed to the $–CH_2–$ and $–CH_3$ groups of TEA.

The ^{19}F MAS NMR spectra were recorded on a Bruker AVANCE III 400 WB spectrometer equipped with a 2.5 mm standard bore CP MAS probehead whose X channel was tuned to 376.55 MHz for ^{19}F, using a magnetic field of 9.39 T at 297 K. The dried and finely powdered samples were packed in the ZrO_2 rotor closed with Kel-F cap which were spun at 20 kHz rate. A total of 2000 scans were recorded with 3 s recycle delay for each sample. All ^{19}F MAS NMR chemical shifts are referenced to the resonances of trichlorofluoromethane ($CFCl_3$) standard (d=0.00).

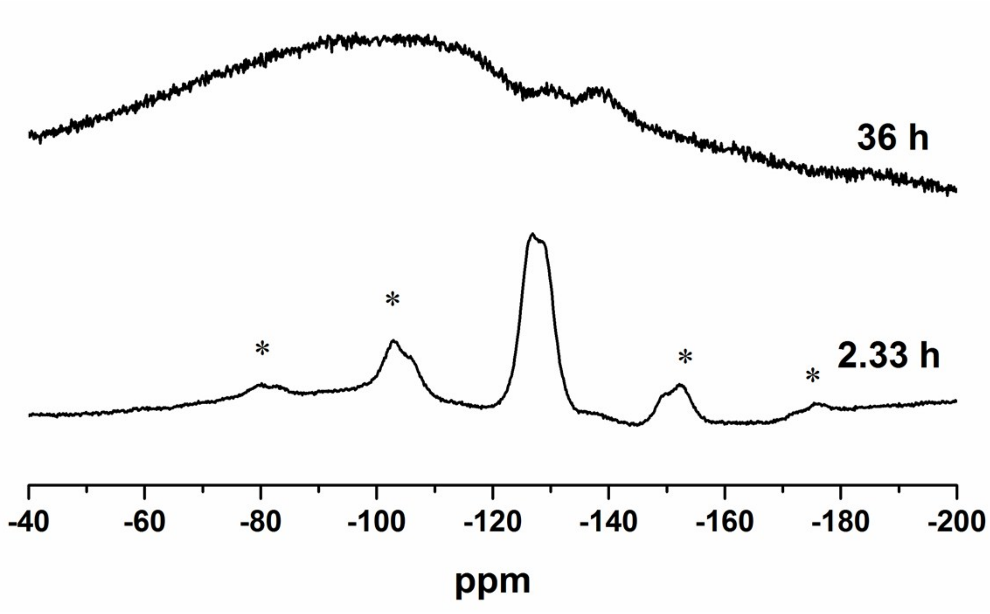


Fig. S7 ^{19}F MAS NMR spectra of the samples crystallizing at 2.33 h (SAPO-34) and 36 h (SAPO-56).