## **Supporting Information**

## High performance nano sheet-like silicoaluminophosphate molecular sieves: synthesis, 3D EDT structural analysis and MTO catalytic studies

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1101	h1l	h2l			
h3l	h4l	h5l			
0kl	1 <i>kl</i>	2kl			
0 <i>kl</i>		2kl			

**Figure S1**. Slices cut from reconstructed reciprocal space of **CHA**-type phase. Reflections in 0*kl* plane are sharp but diffused in *h*0*l* plane, indicating the layer shifting along *a* axis.



**Figure S2**. Presentations for structural model of **CHA**-type framework and **AEI**-type framework, which contains same D6R layers but different stacking manners along *c* axis.



**Figure S3**. Rietveld refinement of powder XRD pattern (Cu K $\alpha$ 1 radiation) of S3 sample with mixture of CHA-type and AEI-type structures. The refinement result gives  $R_{wp}$ : 6.30%;  $R_p$ : 4.96%, respectively.

Sample no.	TOS	Selectivity (%)							
	(min)	CH <sub>4</sub>	$C_2H_4$	$C_2H_6$	$C_3H_6$	$C_3H_8$	C <sub>4</sub>	$C_5^+$	$C_2^{=}+C_3^{=}$
S1	6	0.5	15.6	0.3	22.5	7.5	16.6	37.0	38.1
	606*	1.7	41.7	0.3	38.1	0.4	11.5	6.3	79.8
S2	6	0.8	23.7	0.2	34.8	6.5	20.6	13.3	58.5
	986*	1.4	42.0	0.4	38.9	0.4	11.7	5.2	80.9
S3	6	0.9	28.2	0.1	39.1	2.5	18.8	10.4	67.3
	1206*	1.5	42.5	0.3	40.8	0.3	11.0	3.6	83.3
S4	6	0.6	29.6	0.1	40.2	1.3	21.4	6.8	69.8
	686*	2.5	40.7	0.3	40.2	0.3	12.7	3.3	80.9
S5	6	0.5	23.8	0.2	27.9	3.8	20.2	23.6	61.7
	866*	1.8	33.3	0.3	42.0	0.5	15.7	6.4	75.3

Table S1. MTO Results on Nano SAPO Catalysts with Different Silicon Contents.

Reaction conditions: WHSV =  $2 h^{-1}$ , T =  $400 \circ C$ ,

\* Lifetime: the reaction duration with > 99.9% methanol conversion.