Electronic Supplementary Information (ESI)

1 Experiment section

1.1 Chemical materials:

Polyethylenimine (PEI) (99%, Shanghai Aladdin industrial Co., Ltd., Mw=1800, 10000), Polyethylenimine (PEI) (50% water solution, Shanghai Aladdin industrial Co., Ltd., Mw=70000), Phosphoric acid (85%, Shanghai Lingfeng Co., Ltd.), Aluminum sulfate octadecahydrate (99%, Jiangsu Qiangsheng Co., Ltd.), Tetrapropylammonium bromide (98%, Shanghai Aladdin industrial Co., Ltd.), Sodium hydroxide (96%, Jiangsu Qiangsheng Co., Ltd.), Potassium hydroxide (85%, Jiangsu Qiangsheng Co., Ltd.), Sodium aluminate (99%, Jiangsu Qiangsheng Co., Ltd.), Pseudoboehmite (99%, Shandong Aluminum Co., Ltd.), Silica colloid (30% water solution, Zhejiang Yuda Chemical Co., Ltd.), Trimethylamine (99%, Shanghai Lingfeng Co., Ltd.).

1.2 Synthesis progress:

In a typical synthesis of such mesoporous SAPO-34 (PEI-SAPO-34), 2.3 g phosphoric acid was dissolved in 5.0 g deionized water to a homogeneous solution. Then, 1 g pseudoboehmite was added under vigorous stirring for 2 h. After that 0.6 g silica colloid was added to the slurry and continued stirring 1 h, followed by the dropwise addition of 3 g trimethylamine under vigorous to a homogeneous gel. At last, aqueous solution of PEI (50 % water solution, Mw=70000) (1.0 g PEI dissolved in 4.0 g water) was added under stirring overnight. The final composition was sealed in a 100 mL Teflon lined autoclave, crystallized at 473 K for 50 h. The product was washed with deionized water and then dried at 373 K, finally calcined at 823 K for 10 h. PEI-SAPO-34 (Mw=1800) and PEI-SAPO-34 (Mw=10000) were synthesized following exactly the same procedure except the PEI was added by 0.5 g.

The synthesis of PEI-ZSM-5 was carried out as follow: 0.3 g aluminum sulfate octadecahydrate was dissolved in 20.8 g deionized water, and then 1.3 g tetrapropylammonium bromide and 0.3 g sodium hydroxide were added under vigorous stirring. After that 10.0 g silica colloid was added and continued stirring to a homogeneous gel. At last, aqueous solution of PEI (50 % water solution, Mw=70000) (1.0 g PEI dissolved in 4.0 g water) was added under stirring for 10 h. The final composition was sealed in a 100 mL Teflon lined autoclave, crystallized at 453 K for 72 h. The PEI-ZSM-5 product was washed, dried, and finally calcined at 823 K for 10 h.

The synthesis of PEI-LTL was prepared as follow: 0.4 g sodium hydroxide, 0.6 g potassium hydroxide and 0.2 g sodium aluminate were dissolved in 3.2 g deionized water. After that 6 g silica colloid was added and stirring to a homogeneous gel. At last, aqueous solution of PEI (50 % water solution, Mw=70000) (0.5 g PEI dissolved in 1.0 g water) was added under stirring for 10 h. Then, the composition was sealed in a 100 mL Teflon lined autoclave, crystallized at 443 K for 24 h. The PEI-LTL product was washed, dried, and finally calcined at 823 K for 10 h.

1.3 Characterization:

X-ray powder diffraction (XRD) patterns were recorded on a D/MAX 2500/PC powder diffractometer (Rigaku) using a Cu$K\alpha$ radiation source operated at 40 kV and 200 mA. Transmission electron microscopy (TEM) images were taken using a JEOL JEM-2100 system operated at 200 kV. BET-surface area was measured by N_2 adsorption at liquid nitrogen

temperature using an AUTOSORB-iQ2-MP (Quantachrome) gas sorption system. Specific surface areas were calculated using the Brunauer-Emmett-Teller (BET) model, and the pore size distributions were evaluated from the adsorption branches of the nitrogen isotherms using the Barrett-Joyner-Halenda (BJH) model.

2 TG analysis of the PEI-SAPO-34 (Mw=70000)

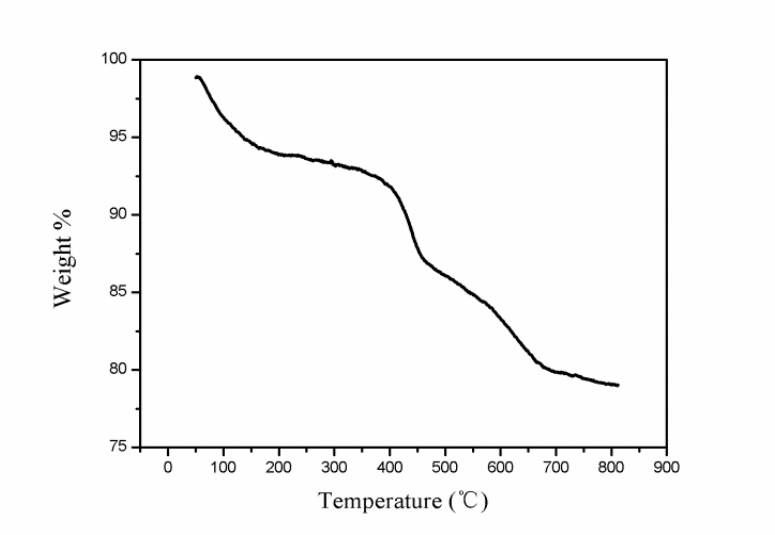

Fig. S1 TG analysis of the PEI-SAPO-34 (Mw=70000)

3 Pore structure properties of PEI-SAPO-34 prepared in the different amount of the PEI added ((a) Mw=1800 and (b) 10000)

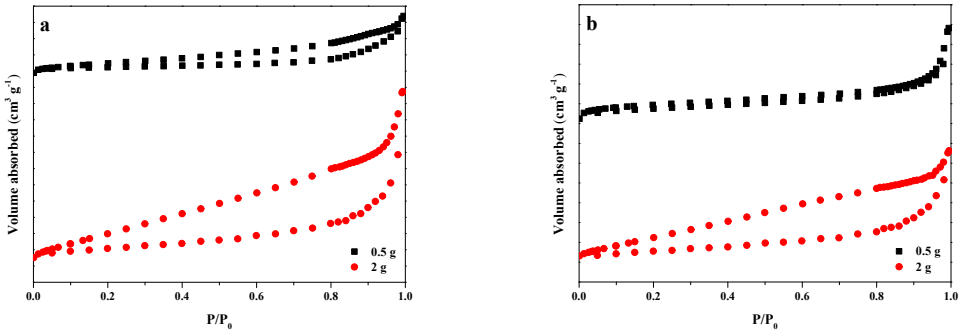

Fig. S2 Nitrogen adsorption/desorption isotherms and BJH pore size distribution for PEI-SAPO-34 prepared in the different amount of the PEI added (a) Mw=1800; (b) Mw=10000.

Table S1 Pore structure properties of PEI-SAPO-34 prepared in the different amount of the PEI added (Mw=1800 and 10000).

Sample	Mass of PEI (g)	S_{BET} (m^2 g^{-1})	V_{meso} (cm^3 g^{-1})	D (nm)	V_{micro} (cm^3 g^{-1})
PEI-SAPO-34 (Mw=1800)	0.5	366.8	0.054	3.176	0.182
PEI-SAPO-34 (Mw=1800)	2	38.99	0.161	3.514	n.a.
PEI-SAPO-34 (Mw=10000)	0.5	234.7	0.068	3.174	0.107
PEI-SAPO-34 (Mw=10000)	2	21.97	0.084	3.830	n.a.

S_{BET} BET specific surface area, V_{meso} mesoporous pore volume, V_{micro} microporous pore volume, and D mesoporous pore size.