

Electronic Supplementary Information

Chemicals:

3-(trimethoxysilyl)propyl]hexadecyldimethylammonium chloride (TPHAC, 60wt% methanol solution) was synthesized in the laboratory, following the reported procedure (Hüttinger, K. J. & Jung, M. F. Kinetik, *Chem. –Ing. –Tech.*, 1989, **61**, 258-259). Aluminium isopropoxide (98%, Aldrich), phosphoric acid (85%, Sigma-Aldrich), trimethylamine (99%, Yakuri Pure Chemicals), dipropylamine (99%, Aldrich), tetraethylorthosilicate (TEOS, Aldrich 98%) and cobalt(II) acetate tetrahydrate (98%, Sigma-Aldrich) were used as received.

Synthesis Methods:

In a typical synthesis of HP-AlPO-5, 5.2 g aluminium isopropoxide was mixed with 15 g H₂O and homogenized with 3 h stirring at room temperature. Into the mixture, 3.0 g phosphoric acid was added, followed by the dropwise addition of 2.1 g trimethylamine under vigorous stirring. Then, aqueous solution of TPHAC (0.91g TPHAC dissolved in 8 g H₂O) was added under stirring. The final molar composition was 1 Al₂O₃/1 P₂O₅/1.6 triethylamine/100 H₂O/0.1 TPHAC. The final synthesis gel was stirred for 2 h at room temperature to obtain homogeneous mixture. For hydrothermal crystallization, the synthesis mixture was heated with stirring at 200°C for 36 h, in a Teflon-coated stainless steel autoclave. The precipitated product was filtered by suction, and washed with distilled water. The product was dried in an oven at 100°C and subsequently calcined in air at 550°C. HP-SAPO-5 and HP-CoAPO-5 were synthesized following exactly the same procedure except the addition of 1.06 g TEOS and 0.32 g cobalt (II) acetate into the final gel composition. The gel composition for HP-SAPO-5 and HP-CoAPO-5 were 1 Al₂O₃/1P₂O₅/1.6 triethylamine/100 H₂O/0.1 TPHAC/0.4 TEOS and 0.1 Co: 0.95 Al₂O₃/1 P₂O₅/1.6 triethylamine/100 H₂O/0.1 TPHAC/0.4 TEOS, respectively.

HP-AlPO-11 was similarly synthesized from the gel composition 1 Al₂O₃/1 P₂O₅/1 dipropylamine/50 H₂O/0.1 TPHAC. For hydrothermal crystallization, the final synthesis mixture was heated with stirring at 200°C for 48 h.

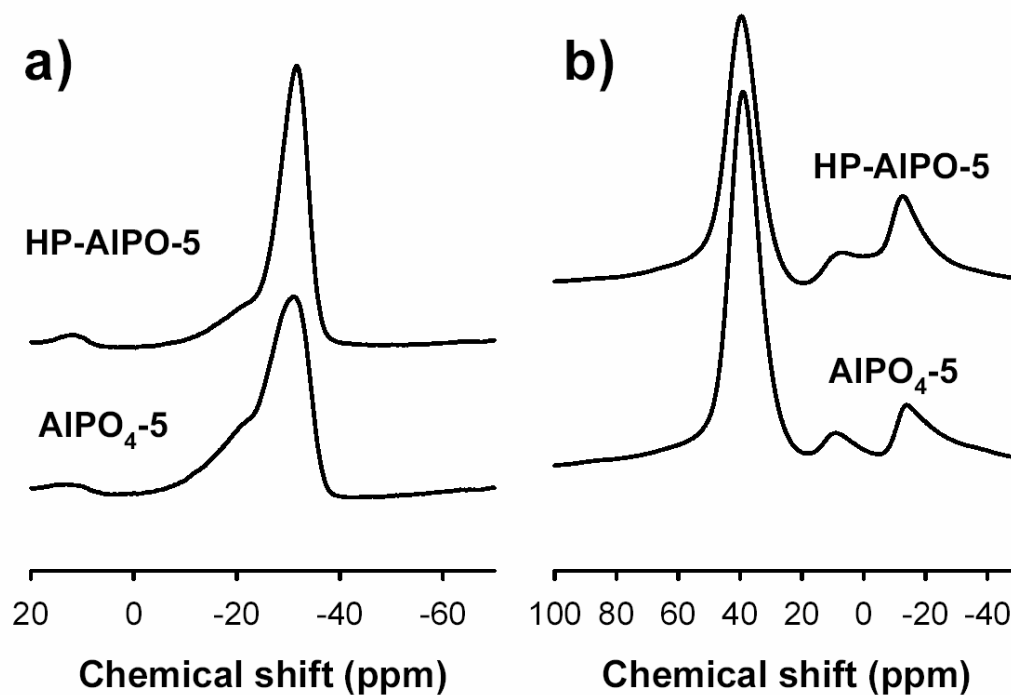


Fig. S1 (a) ^{31}P MAS and (b) ^{27}Al MAS NMR spectra of AlPO₄-5 and HP-AlPO₄-5 samples.

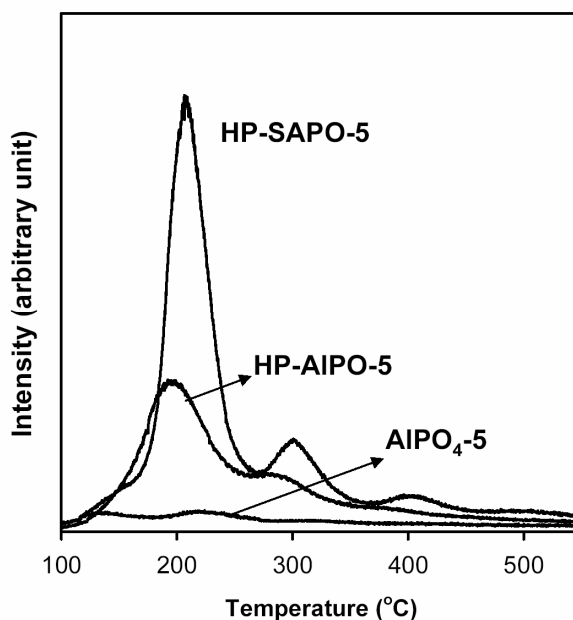


Fig. S2 NH₃-TPD profiles for the various aluminophosphate materials.