

Preparations of High Surface Aluminophosphates from Trialkylphosphates and EtAlCl₂

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Aluminophosphates are structurally diverse compounds containing Al-O-P bond pattern through the whole structure. Since their introduction in 1982 [1], porous tailored aluminophosphates have found growing attention due to their applications as molecular sieves, catalyst carriers, and catalysts. Among various methods, non-hydrolytic syntheses using trialkylphosphates was showing promising results [2].

In our work, we focused on reactions of ethylaluminium dichloride with trimethyl- (TMP), triethyl- (TEP), triisopropyl- (TiPP), and tributylphosphate (TBP). All reactions were carried out under inert atmosphere. We have tested various reaction conditions, investigated reaction mechanisms, and processed obtained xerogels into materials. Various processing conditions were investigated, as well as influence of templating.

After calcination at 300 °C, we obtained amorphous aluminophosphates. Specimens obtained from TMP and TEP xerogels exhibited high surface area (up to 468 m² g⁻¹) provided by small mesopores. Higher calcination temperatures lead towards decrease of surface up to zero at 600 °C. Hydrothermal processing at 200 °C in an autoclave provided non-porous microcrystalline berlinite AlPO₄.

References

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