

Contributed by Moussa Zaarour and Svetlana Mintova

Verified by E.-P. Poh, H. Awala, L. Tosheva

Type Material: [Al₂₄P₂₄O₉₆]

Method: M. Vilaseca, S. Mintova, V. Valtchev, T. H. Metzger, T. Bein [1]
H. van Heyden, S. Mintova, T. Bein [2]

Batch Composition: 1 Al₂O₃ : 3.16 P₂O₅ : 3.16 (TEA)₂O : 186 H₂O.

Source Materials

Aluminum isopropoxide (98 wt.%, Aldrich)
Tetraethylammoniumhydroxide (35 wt.%, Aldrich)
Phosphoric acid (85 wt.%, Aldrich)
Distilled water

Batch Preparation

- (1) 7.76 g Aluminium isopropoxide + 50.52 g tetraethylammoniumhydroxide + 28.69 g H₂O], stir vigorously for 1 h
- (2) Add 13.84 g phosphoric acid very slowly in dropwise to (1), stir 2h^a
- (3) Age for 24 h at room temperature

Crystallization

Vessel: polypropylene (PP) bottles
Temperature: 100°C
Time: 48 h

Product Recovery

- (1) Centrifugation (20 000 rpm, 1h)^b
- (2) Filter and redisperse in water using ultrasonication
- (3) Stable colloidal suspension

Product Characterization

DLS: monodomial particle size distribution, radius~ 90 nm
XRD: AEI-type
SEM: elongated crystals with length/width aspect ratio of 2
N₂ adsorption: BET = 600 m²*g⁻¹, Pore volume = 0.38 mL.g⁻¹

Reference

- [1] M. Vilaseca, S. Mintova, V. Valtchev, T. H. Metzger, T. Bein, J. Mater. Chem.13 (2003) 1526
- [2] H. van Heyden, S. Mintova, T. Bein, J. Mater. Chem. 16 (2006) 514

Notes

- a. Clear suspension is obtained
- b. Processes (1) then (2) were repeated three times