

ATN

MAPO-39

P(50), Al(40), Mg(9)

Contributed by Deepak Akolekar

Verified by P. Norby and by S. Sivasanker

Type Material $H_{1.6}[Mg_{1.6}Al_{64}P_8O_{32}]$

Method D. B. Akolekar, S. K. Kaliaguine [1]

Batch Composition 1.1 R : 0.40 MgO : 0.80 Al₂O₃ : 1.00 P₂O₅ : 41 H₂O (R = di-n-propylamine)

Source Materials

deionized water

orthophosphoric acid (85%, Aldrich)

pseudoboehmite (Vista Chemical Co., 71.8% Al₂O₃)

magnesium oxide (99.9%, Aldrich)

n-dipropylamine (99%, Aldrich, 0.738 g/mL)

Batch Preparation (for 12 g dry, template-free product)

- (1) [70.0 g water + 32.3 g o-phosphoric acid + 15.91 g pseudoboehmite], stir until homogeneous
- (2) [(1) + 2.26 g magnesium oxide + 26 g water], stir until homogeneous
- (3) [(2) + 19.2 mL n-dipropylamine], stir until homogeneous (about 30 minutes) ^a

Crystallization

Vessel: PTFE-lined stainless steel autoclave (150 mL)

Temperature: 150 °C

Time: 114 hours

Agitation: none

Product Recovery

- (1) Stir the total crystallization batch into 1.5 L deionized water
- (2) Filter; wash with deionized water
- (3) Dry at 75 °C
- (4) Yield: > 70% based on Al₂O₃

Product Characterization

XRD ATN [2,3], characteristic strong reflections at $d = 4.19$ and 3.95\AA for as-synthesized material

Elemental Analysis: (exclusive of R and H₂O) (wt%): 6.31 MgO, 34.32 Al₂O₃, 59.37% P₂O₅

Crystal Size and Habit: small irregular platelike particles, $2.5 \times 3.3 \mu\text{m}$

References

- [1] D. B. Akolekar, S. K. Kaliaguine, Zeolites 14 (1994), 620

- [2] S. T. Wilson, E. M. Flanigen, in ACS Symp. Ser. 398, M. L. Occelli, H. F. Robson (eds.) Am. Chem. Soc., Washington, D.C., 1989, p. 329
- [3] L. B. McCusker, G. O. Brunner, A. F. Ojo, Acta Crystallogr. A46 (1990), C 59

Note

- a. Uniform homogeneous gel formation is the important step for obtaining pure phase material.