

Contributed by Juliusz Warzywoda

Verified by T. Gier and by M. Sato

Type Material K₁₀ (Al₁₀Si₁₀O₄₀): wH₂O (w ~8)

Method R M. Barrer, B. M. Munday [1]

Batch Composition 19.9 K₂O : Al₂O₃ : 2 SiO₂ : 378 H₂O

Source Materials

deionized water

potassium hydroxide (pellets, 85% KOH min.)

kaolin (~Al₂Si₂O₅(OH)₄)

Batch Preparation (for 0.8 g product)

- (1) [18.2 g water + 7.95 g potassium hydroxide]; dissolve KOH pellets in HDPE ^a bottle
- (2) [(1) + 0.78 g kaolin]; seal the bottle and shake for 15 seconds ^b

Crystallization

Vessel: HDPE bottle

Temperature: 80°C

Time: 12 days

Agitation: occasional shaking

Product Recovery

- (1) Filter to recover solids
- (2) Wash with deionized water until pH of wash water is neutral
- (3) Dry at 80°C
- (4) Yield: 0.83-0.86 g (dry) (90% on Al or Si)

Product Characterization

XRD: Barrer K-F (no competing phases) [2]

Elemental Analyses: K₂O : Al₂O₃ : 2 SiO₂ : 3 H₂O [3]

Crystal Size and Habit: inter-penetrating prismatic crystals, 2 μm or less

References

- [1] R. M. Barrer, B. M. Munday, J. Chem. Soc. (A) (1971) 2914
- [2] J. D. Sherman in ACS Symp. Series 40, J. R. Katzer (ed.), Am. Chem. Soc., Washington, D. C., 1977, p. 30
- [3] R. M. Barrer, J. W. Baynham. J. Chem. Soc. (1956) 2882

Notes

- a. High density polyethylene.
- b. Upon addition of kaolin to the KOH solution, a slowly settling suspension of solids, rather than a homogeneous gel, is formed.