Contributed by Ana Palčić

Verified by A. Ristic, J. Grand

Type Material: K₄Na₁₂[Si₂₆Zn₈O₇₂]·18H₂O

Method: C. Röhrig and H. Gies [1]

Batch Composition: TEOS : 0.1 ZnO : 0.5 NaOH : 0.5 KOH : 0.08 TEAOH : 44 H₂O

Source Materials
- deionized water (DI)
- zinc oxide (99%, Prolabo)
- sodium hydroxide (97%, Sigma Aldrich) potassium hydroxide (97%, Sigma Aldrich) tetraethylammonium hydroxide (35% water solution, Aldrich) tetraethoxysilane (98%, Sigma Aldrich)

Batch Preparation (for 2.9 g dry product)
1) [53.434 g water + 2.078 g TEAOH + 1.44 g NaOH + 2.302 g KOH] stir in a polypropylene bottle until clear solution is formed
2) [(1) + 0.574 g zinc oxide] stir for 30 min
3) [(2) + 15 g tetraethoxysilane] hydrolyze for 8 h

Crystallization
- Vessel: Teflon-lined stainless steel autoclave
- Temperature: 180°C
- Time: 10 days
- Agitation: none

Product Recovery
1) Dilute reaction mixture with water
2) Filter and wash with water
3) Dry at 80°C
4) Yield: 2.9 g

Product Characterization
- XRD: RSN; competing phase: no
- Crystal size and habit: intergrown crystals forming large aggregates, size 100-1500 nm.

Reference

Notes
a. ZnO is dispersed in the silicate solution.
b. The product precipitates at the bottom of the autoclave. It is very hard to crush.