

RSN

RUB-17

Si(78), Zn(22)

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Type Material: $K_4Na_{12}[Si_{28}Zn_8O_{72}] \cdot 18H_2O$

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^a

Crystallization

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

Product Recovery

- (1) Dilute reaction mixture with water^b
- (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

- [1] C. Röhrig, H. Gies, Angew. Chem. Int. Ed. 34 (1995) 63

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.