

**Contributed by** Moussa Zaarour and Svetlana Mintova

**Verified by** D. Stosic, D. Wales and X. Zou

**Type Material:** TMA<sub>96</sub> [Al<sub>96</sub>Si<sub>96</sub>O<sub>384</sub>] wH<sub>2</sub>O (w ~216)

**Method:** S. Mintova, N. H. Olson, V. Valtchev, T. Bein [1]

**Batch Composition:** 8 Na<sub>2</sub>O : 11.25 SiO<sub>2</sub> : 1.8 Al<sub>2</sub>O<sub>3</sub> : 13.4 (TMA)<sub>2</sub>O : 721 H<sub>2</sub>O

#### Source Materials

silica sol (SM-30, 30%, Aldrich)

aluminium isopropoxide [Al(OiPr)<sub>3</sub>] (Aldrich)

tetramethylammonium hydroxides pentahydrate (TMAOH.5H<sub>2</sub>O, 97%, Aldrich)

sodium hydroxide (NaOH, Mallinckrodt, Chesterfield, MO)

distilled water

#### Batch Preparation

(1) [2.25 g 30% silica sol + 2 g H<sub>2</sub>O]

(2) [0.75 g Al(OiPr)<sub>3</sub> + 5 g TMAOH.5H<sub>2</sub>O + 0.6 g 1 M NaOH + 7.0 g H<sub>2</sub>O]

(3) [(1)+(2)] under stirring<sup>a</sup>

#### Crystallization

Vessel: polypropylene (PP) bottles

Temperature: 40 °C

Time: 7 days

Agitation: orbital shaker (175 rpm)

#### Product Recovery

(1) Centrifugation (40 000 rpm, 2h), washing till pH=9

(2) Stable colloidal suspension of zeolite crystals in water

(3) Dry solid: freeze drying or conventional oven

#### Product Characterization

DLS: 40 to 80 nm in diameter

XRD: LTA

HRTEM: Fully crystalline (40 to 80 nm in diameter)

#### References

[1] S. Mintova, N. H. Olson, V. Valtchev, T. Bein, Science 283 (1999) 958

#### Notes

a. Clear precursor solution is obtained