MOZ ZSM-10 Si (88), Al (12)

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Type Material: $K_{24}Al_{24}Si_{84}O_{216}\cdot xH_2O\cdot yR$[1]
(SDA = 1,4-dimethyl-1,4-diazabicyclo[2.2.2]octane dihydroxide)

Method: J.B. Higgins and K.D. Schmitt [1]

Batch Composition: 1 SiO_2 : 0.068 Al_2O_3 : 29.5 H_2O : 0.06 (SDA^{2+})O : 0.365 K_2O

Source Materials
deionized water (MilliQ quality from Millipore)
fumed silica (Aldrich)
aluminum hydroxide (Reheis F2000, 5.20 mmol Al_2O_3/g or from Aldrich, 57% Al_2O_3)
potassium hydroxide (Aldrich, 90 wt.% diluted with water to 20 wt%)
1,4-dimethyl-1,4-diazabicyclo[2.2.2]octane dihydroxide (made in-house; 10 wt% or 1.135 N; purity confirmed by NMR and CHN)

Batch Preparation (for 1.351 g dry product)
(1) Combine 10.535 g MilliQ water, 8.176 g potassium hydroxide (20 wt.%), and 0.487 g aluminum hydroxide in a 50 ml polypropylene closed vial. The mixture was stirred using a magnetic bar for 15 min.
(2) Add 2.402 g fumed silica; magnetically mixed to homogenize.
(3) Add 4.227 g SDA solution; magnetically mixed to homogenize.
(4) Cover and magnetically stir for 3 days at room temperature.[a]

Crystallization
Vessel: Teflon-lined stainless steel autoclave
Temperature: 100° C
Time: 15 days
Agitation: 60 rpm (tumbling oven)

Product Recovery
(1) Remove reactor from oven and quench
(2) Filter (with glass-frit funnel) to recover solids
(3) Wash product with ~300 mL DI water
(4) Dry in an oven at 100°C
(5) Yield: 1.351 g

Product Characterization
XRD: MOZ
Elemental analysis: 7.5 SiO_2 : 1 Al_2O_3 [c]
Crystal size and habit: Aggregates of poorly faceted nano-sized crystallites
Micropore volume of calcined potassium-form is 0.12 cc/g by nitrogen adsorption

Reference

[1] J.B. Higgins, K.D. Schmitt, *Zeolites* 16 (1996) 236-244.

Notes

a. pH of the initial gel is 13.1 and the pH of the final gel after crystallization is 12.7.
b. as-synthesized; organic content not specified.