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Supporting information



Figure 1: Identification of zeolite products.

The WinXpow software (STOE & CIE GmbH 2008) has been employed to generate theoretical XRD patterns for all frameworks using cif-files obtained from the ICSD (Inorganic Crystal Structure ⁵ Database), release 2013.^{1,2,3} For the product in RbOH, the unit cell parameters of the synthesized material have been refined and employed for the calculation of the theoretical diffraction pattern.⁴



Figure 2: Direct syntheses from gels with molar composition 3.5 K_2O : 0.2 Na_2O : Al_2O_3 : 5.4 SiO_2 : 314 H_2O . The mixtures were crystallized at 95°C. The Si- and Al-sources were either colloidal silica (Ludox AS30, Sigma Aldrich) and Al(OH)₃ or tetraethyl orthosilicate (TEOS) and aluminium ⁵ isopropoxide.



Figure 3: Chabazite products from zeolite Y with different cation composition. Small additional reflections of presumably GME (7,45° 2 θ) and MER (10,77 and 16,50 °2 θ).

Sample	Formula (• x H ₂ O)	Yield (mol/mol FW)	Theor. Max. (mol/mol FW)	Yield (%)
Na-Y	$Na_{52}Al_{52}Si_{140}O_{384}$			
CHA(Na-Y)	Na _{0,30} K _{3,98} Al _{4,28} Si _{7,71} O ₂₄	12.03	12.15	99.01
K-Y	$Na_2K_{50}Al_{52}Si_{140}O_{384}$			
CHA(K-Y)	$Na_{0,10}K_{3,9}Al_{4,0}Si_{8,0}O_{24}$	12.71	13.00	97.78
H-Y	Na _{6,6} H _{45,4} Al ₅₂ Si ₁₄₀ O ₃₈₄			
CHA(H-Y)	Na _{0,08} K _{3,82} Al _{3,90} Si _{8,10} O ₂₄	13.71	13.84	99.10
NH4-Y	$Na_{6.6}(NH_4)_{45.4}Al_{52}Si_{140}O_{384}$			
CHA(NH ₄ -Y)	Na _{0,11} K _{3,76} Al _{3,87} Si _{8,13} O ₂₄	12.93	13.44	96.21

Table 1: Based on the Si/Al ratio (NMR), cation composition (AAS), and water content (measured by

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TGA after equilibration with a saturated LiCl solution), the yield of the transformation was determined gravimetrically. The theoretical yield (mol/mol framework) is limited by the amount of Al in the starting material. As the fractions of the theoretically possible yields are close to 100%, it can be assumed that all Al of the starting material goes into the product.

	Si/Al (ICP)	Si/Al (EDX)
MER	2.0	2.1
ANA	2.3	2.2
ABW		1.2

Table 2: Si/Al ratios of the ABW (96 h), MER (96 h) and ANA (48h) zeolite product.

References

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