

Zeolite synthesis using flexible diquaternary alkylammonium ions $(C_nH_{2n+1})_2HN^+(CH_2)_5N^+H(C_nH_{2n+1})_2$ with $n = 1\sim 4$ as structure-directing agents

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The use of flexible, linear diquaternary alkylammonium ions $(C_nH_{2n+1})_2HN^+(CH_2)_5N^+H(C_nH_{2n+1})_2$ with $n = 1\sim 4$ as structure-directing agents for zeolite synthesis in the presence of alkali metal cations is described. The overall synthesis results of this study reveal that the phase selectivity of the crystallization differs significantly according to the length of dialkylammonium groups, as well as to the concentration of inorganic components in synthesis mixtures. Among the ammonium ions studied here, the $(CH_3)_2HN^+(CH_2)_5N^+H(CH_3)_2$ and $[(CH_3)_2CH]_2HN^+(CH_2)_5N^+H[CH(CH_3)_2]_2$ ions were found to produce zeolites levyne and MCM-22, respectively, both of which are known to generally crystallize in the presence of cyclic or polycyclic organic additives, when the concentrations of Al and alkali metal cations in the synthesis mixture are properly selected.