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高铝**MAP**沸石的非自发结晶动力学研究

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摘要 在强碱性水溶液体系中,以水玻璃为硅源,以铝酸钠为铝源,在类质同晶高硅P沸石晶种导向作用下,反应物中自发生成的A型沸石可转晶为纯相高铝MAP沸石。升高反应温度有利于提高产物的结晶度。由不同温度下的晶化曲线计算出MAP沸石表观生长活化能为59.6kJ.mol^-^1。不用晶种时,同一反应物体系结晶产物为单一的A型沸石。在该反应物体系中,A型沸石的成核活化能与生长活化能分别为40.3和50.7kJ.mol^-^1。MAP高的生长活化能以及A型沸石相对低的成核与生长活化能揭示合成MAP沸石时使用晶种的原因。

关键词 沸石 结晶动力学 水玻璃 铝酸钠

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Studies on the non-spontaneous crystallization kinetics of MAP zeolite

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Abstract Pure phase of MAP zeolite (GIS type) was synthesized in the highly basic solution with water glass and aluminum sulfate as raw material by seeding with NaP, an isotopic silica rich GIS type zeolite. The molar ratios of the reactant composition were Na~2O:Al~2O~3:SiO~2: H~2O=(2.4-5.4):1.0:2.0:102.6. The crystallization of the zeolite was carried out at the temperature of 70℃, 80℃, 90℃ and 100℃, respectively. The influence of the ratio of Na~2O/SiO~2, the reaction temperature, and the reaction time was investigated. A process for transformation zeolite A to zeolite MAP was observed in the reactant with XRD. The crystallinity of the zeolite prepared was high when increasing the synthesis temperature. The crystallization kinetic curves were determined in the reactant with or without seeding at different reaction temperature. The apparent energy of crystallization activation is 59.6kJ.mol^-^1 calculated from the crystallization curves at different reaction temperature. Pure phase of zeolite A was obtained in the same reactant and at the same reaction conditions without seeding. The activation energy of nucleation and crystallization is 40.3kJ.mol^-^1 and 50.7kJ.mol^-^1 respectively for zeolite A in same reactant system. The high crystallization activation energy for MAP zeolite reveals the reason for seeding while synthesis.

Key words ZEOLITE CRYSTALLIZATION KINETICS WATER GLASS SODIUM ALUMINATE

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