

## HCl 处理后局部有序 Y 沸石的二次晶化

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**摘要** 将商品 Y 型沸石用 HCl 处理后, 运用 X 射线粉末衍射, 透射电镜和扫描电镜、红外光谱及  $^{27}\text{Al}$  和  $^{29}\text{Si}$  魔角旋转核磁共振对其进行了表征. 结果表明, 酸处理后 Y 沸石接近无定形, 其长程有序性遭到破坏, 但还保留部分局部结构. 以不同浓度酸处理后的 Y 沸石为前驱体, 在  $150\text{ }^\circ\text{C}$ ,  $0.3\text{ mol/L NaOH}$  条件下采用蒸汽辅助干胶转化法进行二次晶化, 可以获得丝光沸石, 其相纯度与前驱体的 Si/Al 密切相关. 随 Si/Al 比不同, 所得丝光沸石形貌由纳米针状堆积逐渐向微米单块状变化, 且其比表面积可达  $400\text{ m}^2/\text{g}$  以上, 微孔孔容在  $0.19\text{ cm}^3/\text{g}$ .

**关键词:** Y 沸石 盐酸处理 局部有序 丝光沸石 蒸汽辅助干胶转化

**Abstract:** A series of acid-treated Y zeolite crystals with different crystallinities were obtained by treating commercial Y zeolite in HCl solution. The acid-treated Y zeolites were characterized by X-ray diffraction, transmission electron microscopy, scanning electron microscopy, Fourier transform infrared spectroscopy, and  $^{27}\text{Al}$  and  $^{29}\text{Si}$  MAS NMR. The results indicated that the acid-treated Y zeolites were almost amorphous but some short-range-order aluminosilicate species were retained. The acid-treated Y zeolites were recrystallized at  $150\text{ }^\circ\text{C}$  with  $0.3\text{ mol/L NaOH}$  solution by the steam-assist crystallization method, and the pure mordenite zeolite products with the morphology from aggregate of nano-rod to micron-sized crystal were obtained within a suitable Si/Al ratio range. Their BET surface area is higher than  $400\text{ m}^2/\text{g}$  and micropore volume is up to  $0.19\text{ cm}^3/\text{g}$ .

**Keywords:** Y zeolite, hydrochloric acid treatment, local range order, mordenite, steam-assisted crystallization

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