



CHUTIMA THONGKASAM : DEALUMINATION STUDY OF ZEOLITE Y  
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ZEOLITE Y/DEALUMINATION/HYDROCHLORIC/AMMONIUM  
HEXAFLUOROSILICATE/SILICON TETRACHLORIDE/ION EXCHANGE

In this work, the study of modification of synthesized zeolite Y ( $4.6\text{Na}_2\text{O}:\text{Al}_2\text{O}_3:10\text{SiO}_2:180\text{H}_2\text{O}$ ; Si/Al ratio = 3.7) by dealumination was examined. The factors affecting on each step of dealumination methods such as reaction temperature, time, concentration and type of reagents, cation and anion were investigated. The comparison between different dealumination methods of hydrochloric (HCl), ammonium hexafluorosilicate ( $\text{NH}_4\text{SiF}_6$ ) and silicon tetrachloride ( $\text{SiCl}_4$ ) was also demonstrated. It was found that the ammonium hexafluorosilicate method produced the highest Si/Al mole ratio in the range of 5.2-11.3 and it remained the crystallinity about 99-21%. The Si/Al mole ratio could be increased with increasing  $\text{NH}_4\text{SiF}_6/\text{NH}_4\text{OAc}$ . The presence of ammonium acetate ( $\text{NH}_4\text{OAc}$ ) was found to be necessary in the dealumination with  $\text{NH}_4\text{SiF}_6$ , in order to remain high percentage of crystallinity. In addition, the Na form is suitable for dealumination with  $\text{NH}_4\text{SiF}_6$  more than Li and K form. It may depend on cationic size. In the case of HCl dealumination method, which included the effect of  $\text{Cl}^-$ , the calcination temperature for removing  $\text{NH}_3$  and HCl concentration, it gave Si/Al ratio about 3.9-4.4 and crystallinity about 64-16%. Moreover, the strong acid (HCl and  $\text{HNO}_3$ ) was found to be more suitable for dealumination than weak acid ( $\text{CH}_3\text{COOH}$ ). Under the studied

conditions, the result of  $\text{SiCl}_4$  dealumination showed the amount of Si/Al ratio about 5.8 and crystallinity about 73%.

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