

Hydrothermal synthesis of zeolite A utilizing commercial bentonite clay as the Si/Al source

ABSTRACT

Formation of zeolites from bentonite clay has not been largely explored since most research on zeolite formation from clay is currently more focused on kaolinite clay. In this study, zeolite A was synthesized via hydrothermal technique using commercial bentonite clay. To activate the bentonite clay, it underwent thermochemical treatment for 24 hours at 98 ± 2 °C in the presence of concentrated hydrochloric acid. Reaction mixture of zeolite A was obtained by mixing the activated bentonite clay with sodium hydroxide and sodium aluminate. The reaction mixtures were prepared at various silica to alumina ratio (1.0, 1.25, 1.5, 1.75 and 2.0) and molarity of sodium hydroxide (1.5M, 2.0M, 2.5M, 3.0M and 3.5M). All of the reaction mixtures underwent aging for 30 minutes and crystallized for 8 hours at 100°C. The effect of silica to alumina ratio and molarity of sodium hydroxide was examined using XRD and SEM. The optimum silica to alumina ratio and molarity of NaOH for the synthesis was found to be 1.5 and 2.5M respectively.