

SYNTHESIS OF Fe-BENTONITE AND ITS APPLICATION IN PHENOL HYDROXYLATION CATALYSIS

(1 / 2 (2008))

Abstract

The modification of the natural bentonite by intercalation and pillarisation has been studied. This research is inspired by the reasons that the major end-uses for bentonite, especially in Indonesia, are in relatively low-technology applications, the potential properties and the high abundance of bentonite so that it should be improved to be more valuable material, high-specification and high-value applications.

Natural/fresh bentonite was modified by direct and indirect pillarisation. In direct method, Al and Fe ions were used as pillaring agent to produce a bigger clay pore size. In indirect method, the first step was intercalation process to insert organic surfactant molecules (HDTMA) inside the clay molecules to get bigger pore size, and then the next step was pillarisation process using Fe cationic. Natural bentonite was intercalated with HDTMA-Br 1,5 % solution before pillared with Fe metal to give HDTMA-bentonite forms. Pillarisation of fresh natural bentonite and HDTMA-bentonite with Fe metal has been done in various mol Fe solutions. The ratio of bentonite and intercalating agent or pillaring agent was 1 gr/50 ml. The mixture was agitated, and then the solid phase was washed with distilled water until free of chlorine ion. Then it was dried and calcined at 450 °C for 6 hours in N₂ and O₂ atmosphere. The modified bentonites were characterized by FT-IR spectrometer, XRD diffractometer, and BET method.

The modified bentonites were applied for phenol hydroxylation catalysis. The results showed that these materials have good potential as catalyst.

In this 2nd year report, we focus on improvement of catalyst material synthesis and optimize the reaction condition.