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ADSORPTION OF CADMIUM (II) BY KAOLINITE

A PROJECT REPORT PRESENTED BY

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ABSTRACT

The kaolinite structure possesses great advantages in many processes due to its high chemical stability and low expansion coefficient. To analyze the adsorption behaviour of kaolinite, Cd was studied at five different concentrations (200, 80, 30, 20 and 5 mg/l) The Cadmium removal was 68, 47, 24, 18 and 4.9 mg/l respectively. The effect of pH, metal ion concentration, and contact time were studied in batch experiments. The Langmuir equation fitted the data better than the Freundlich equation by describing the data over the entire concentration range. Therefore, Cadmium adsorption phenomenon is a monolayer sorption on a surface containing a limited number of sites.

The adsorption of Cd^{2+} was explained by assuming that the kaolinite surface was composed of equal amounts of silanol and aluminol groups and silanol group was responsible for retaining the bulk of the adsorbed Cd^{2+} through the formation of the =SiOCd(OH)_2^- species.

The 0th and 1st order rate laws are obeyed by the adsorption phenomena. The increased initial metal ion concentration decreased the percent adsorption. Result indicated that the adsorption capacity of the Kaolinite increased with an increase in the pH.