

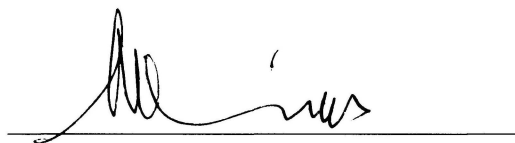
**ADSORPTION KINETICS AND THERMODYNAMICS OF DYE
ONTO LAYERED DOUBLE HYDROXIDE (LDHs)**

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**Final Year Project Report Submitted in
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ABSTRACT

Adsorption Kinetics and Thermodynamics of Dye onto Layered Double Hydroxide (LDHs)

Hydrotalcites (HTs) were found to have high anionic exchange capacity for the removal of Reactive Black 5 (RB5) which is one of the textile dyes used in the industry. In this study, $\text{MgAlNO}_3\text{-LDH}$ was synthesized by co-precipitation method. Layered double hydroxides (LDH) is a class of ionic lamellar solids with positively charged layers with two kinds of metallic cations and exchangeable hydrated gallery anions. They are also known as anionic clays or hydrotalcite-like compounds in the name of polytypes of corresponding (Mg-Al) based minerals. Different parameters that affect the adsorption of dye were studied in this experiment which includes the effect of contact time, the effects at different initial concentration, adsorbent dosage, pH and temperature. Equilibrium sorption isotherms and kinetics were also investigated. The kinetic data obtained at different concentrations have been analyzed using pseudo-first order, pseudo-second order kinetic model. The equilibrium data are fitted to the Langmuir and Freundlich isotherm equations. From these, the adsorption efficiency, adsorption energy, adsorption capacity and the rate constant value for the adsorption process is calculated. The temperature thermodynamic parameters like ΔG° , ΔH° and ΔS° are calculated based on the effect of temperature. The results revealed that $\text{MgAlNO}_3\text{-LDH}$ was a promising sorbent for the removal of reactive black 5 from aqueous solution.