

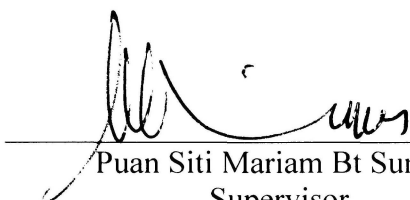
**LAYERED DOUBLE HYDROXIDE AS A POTENTIAL SORBENT FOR THE
REMOVAL OF REACTIVE BLACK 5 (RB5)**

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**Final Year Project Report Submitted in Partial Fulfillment of the Requirements
for the Degree of Bachelor of Sciences (Hons.) Applied Chemistry in the Faculty
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This Final Year Project Report entitled “**LAYERED DOUBLE HYDROXIDE (LDH) AS A POTENTIAL SORBENT FOR THE REMOVAL OF REACTIVE BLACK 5 (RB5)** ” was submitted by Noor Adibah Binti Md Adib, in partial fulfillment of the requirements for the Degree Of Bachelor Of Sciences(Hons.) Of Applied Chemistry, in Faculty Of Applied Science, was approved by



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ABSTRACT

LAYERED DOUBLE HYDROXIDE (LDHS) AS A POTENTIAL SORBENT FOR THE REMOVAL OF REACTIVE BLACK 5 (RB5)

Layered double hydroxides (LDHs) with a Mg/Al molar ratio of 4:1 were prepared by synthesized using a co-precipitation method to investigate their adsorption capabilities in the removal Reactive Black 5 from aqueous solution. The effect of contact time, adsorbent dosage, particle size and temperature on the adsorption of reactive black 5 (RB5) by LDHs was investigated. Characterization of LDH using X-Ray Diffractogram showed the presence sharp and intense peaks with d-spacing 7.9 °Å which signifying high crystallinity. Fourier Transform Infrared, FTIR confirmed the impurity inorganic charge balancing anions, Nitro group presence at the 1641.59 and 1384.41 cm^{-1} . From Scanning Electron Microscope (SEM) after adsorption, LDH were packed with RB5 compared before. RB5 can be adsorbed on the surface or enter the interlayer region of the LDH by anion exchange. In the adsorption of RB5 on the LDH, maximum uptake or removal was achieved at 99.41% at 20 ppm concentration of dye at an equilibrium time of 4 h, with 0.1 g LDH, 250 μm particle size of LDH and 30 °C. Isotherms for RB5 sorption LDHs were well described using the Langmuir and Freundlich equations, respectively. The best fit equilibrium model was Langmuir isotherms followed by Freundlich isotherm, $(R^2, 0.9976 > 0.9411)$. From Langmuir, Adsorption capacity was found to be 61.3497 mg/g. From Freundlich isotherm, $n = 3.2468$ indicates favorable adsorption. As the conclusion, adsorption experiments confirmed that LDH was effective in remove of RB5 from aqueous solution.