

KAJIAN ADSORPSI ZAT WARNA REMAZOL RED RB PADA ADSORBEN Mg/Al HIDROTALSIT TERKALSINASI

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INTISARI

Kajian adsorpsi Mg/Al Hidrotalsit terkalsinasi (Mg/Al HT-K) untuk adsorpsi zat warna Remazol Red RB telah dilakukan. Mg/Al HT-K disintesis menggunakan metode kopresipitasi dari $\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ dan $\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ pada pH 10 dengan perbandingan mol Mg(II) dan Al(III) 2:1, dilanjutkan dengan pemanasan temperatur tinggi (450 °C) selama 5 jam. Adsorben hasil sintesis dikarakterisasi menggunakan *X-Ray Diffraction* (XRD), *Fourier Transform Infra Red Spectroscopy* (FT-IR), dan *Scanning Electron Microscopy-Energy Dispersive X-Ray* (SEM-EDX). Mg/Al HT-K digunakan untuk mengadsorpsi zat Remazol Red RB sehingga diperoleh kondisi optimum adsorpsi yang meliputi derajat keasaman (pH), waktu kontak, dan konsentrasi larutan zat warna.

Hasil penelitian menunjukkan kondisi optimum adsorpsi zat warna Remazol Red RB menggunakan Mg/Al HT-K optimum pada pH 3 dengan konsentrasi optimum sebesar 35 mg/g dan volume sebanyak 20 mL selama 150 menit. Adsorben Mg/Al HT-K memiliki kemampuan adsorpsi dengan kapasitas adsorpsi sebesar 24,529 mg/g. Kinetika adsorpsi zat warna Remazol Red RB pada Mg/Al HT-K mengikuti kinetika orde kedua semu, dengan konstanta laju adsorpsi atau k_2 sebesar $5,40 \times 10^{-2} \text{ g mg}^{-1} \text{ min}^{-1}$. Adsorpsi Remazol Red RB pada Mg/Al HT-K mengikuti model isoterm Freundlich dengan nilai K_F sebesar 29,758 mol/L dan nilai n sebesar 1,022.

Kata kunci: adsorpsi, isoterm, kalsinasi, Mg/Al Hidrotalsit, Remazol Red RB

ADSORPTION STUDY OF REMAZOL RED RB DYE ON CALCINED Mg/Al HYDROTALCITE ADSORBENT

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ABSTRACT

An adsorption study of calcined Mg/Al Hydrotalcite (Mg/Al HT-K) for the adsorption of Remazol Red RB dye has been accomplished. Mg/Al HT-K was synthesized using the coprecipitation method of $\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ and $\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ at pH 10 with a molar ratio of Mg(II) and Al(III) 2:1, followed by high heating temperature (450 °C) for 5 hours. The synthesized adsorbents were characterized using X-Ray Diffraction (XRD), Fourier Transform Infra Red Spectroscopy (FT-IR), and Scanning Electron Microscopy-Energy Dispersive X-Ray (SEM-EDX). Calcined Mg/Al HT is used to adsorb Remazol Red RB so that optimal adsorption conditions are obtained which include acidity (pH), contact time, and concentration of dye solution.

The results showed that the optimal condition of adsorption of Remazol Red RB dye using Mg/Al HT-K was optimal at pH 3 with an optimum concentration of 35 mg/g and a volume of 20 mL for 150 minutes. The adsorption kinetics of Remazol Red RB dye in Mg/Al HT-K followed the pseudo second order kinetics, with an adsorption rate constant of $5.40 \times 10^{-2} \text{ mg g}^{-1} \text{ min}^{-1}$. In Mg/Al HT-K followed the Freundlich isothermic model with a K_F value of 29.758 mol/L and an n value of 1.022.

Keywords: adsorption, calcination, isotherms, Mg/Al Hydrotalcite, Remazol Red RB