

SINTESIS GARAM HIDROKSIDA NIKEL TERLAPIS (Ni-LHS) DAN APLIKASINYA SEBAGAI ADSORBEN ZAT WARNA REMAZOL YELLOW FG

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INTISARI

Sintesis garam hidroksida nikel terlapis (Ni-LHS) dan aplikasinya sebagai adsorben zat warna remazol *yellow* FG telah dilakukan. Tujuan utama dari penelitian ini adalah untuk mengembangkan adsorben yang ramah lingkungan dan efektif sebagai adsorben zat warna. Penelitian diawali dengan mensintesis Ni-LHS dengan metode kopresipitasi dan *grinding* menggunakan $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ dan NaOH. Rasio mol OH/Ni yang digunakan yaitu 0,3; 0,6 dan 0,9. Material Ni-LHS yang dihasilkan dikarakterisasi menggunakan spektrofotometer fourier transform infra red (FTIR), *x-ray powder diffraction* (XRD), dan *scanning electron microscopy* (SEM). Kestabilan Ni-LHS ditentukan oleh pengaruh pH larutan dan selanjutnya Ni-LHS diaplikasikan sebagai adsorben zat warna remazol *yellow* FG.

Karakterisasi menggunakan XRD menunjukkan bahwa Ni-LHS memiliki puncak difraksi pada 2θ sekitar 12, 25, 33, 60°. Sintesis Ni-LHS optimum pada rasio mol OH/Ni 0,6. Hasil penelitian menunjukkan bahwa Ni-LHS stabil pada pH > 3. Kondisi optimum untuk mengadsorpsi zat warna remazol *yellow* FG diperoleh pada pH 3 dengan waktu kontak 60 menit. Konstanta laju reaksi (k) berdasarkan model kinetika Ho untuk Ni-LHS metode kopresipitasi dan *grinding* masing-masing sebesar 20554 dan 19670 $\text{g mol}^{-1} \text{menit}^{-1}$. Kapasitas adsorpsi (q_{max}) berdasarkan model isoterm Langmuir sebesar $1,786 \times 10^{-4} \text{ mol g}^{-1}$ untuk kedua metode.

Kata kunci: Ni-LHS, adsorpsi, kopresipitasi, *grinding*, remazol *yellow* FG

**SYNTHESIS OF NICKEL LAYERED HYDROXIDE SALTS (Ni-LHS)
AND ITS APPLICATION AS REMAZOL YELLOW FG DYE
ADSORBENT**

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ABSTRACT

Synthesis of Nickel Layered Hydroxide Salts (Ni-LHS) and its application as remazol *yellow* FG dye adsorbent had been conducted. The main goal of this research is to develop environmentally friendly and effective material as a dye adsorbent. This research was initiated by synthesis of Ni-LHS through coprecipitation and grinding method using $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ and NaOH. The mole ratios of OH/Ni that is used were 0.3, 0.6 and 0.9. Ni-LHS were characterized by spectrophotometer fourier transform infra red (FTIR), x-ray powder diffraction (XRD), and scanning electron microscopy (SEM). The stability of Ni-LHS was determined by the effect of pH solution and then Ni-LHS was applied as remazol yellow FG dye adsorbent.

Characterization of XRD showed that Ni-LHS had diffraction peaks at 2θ around 12, 25, 33, and 60° . Synthesis of Ni-LHS was optimum at the mole ratio of OH/Ni 0.6. The result showed that Ni-LHS were stable at $\text{pH} > 3$. The optimum condition to adsorp remazol yellow FG dye obtained at pH 3 with contact time of 60 min. The adsorption rate constant (k) based on the Ho kinetic model for Ni-LHS coprecipitation and grinding methods were 20554 and $19670 \text{ g mol}^{-1} \text{ min}^{-1}$. The adsorption capacity (q_{max}) based on the Langmuir isotherm model were $1.786 \times 10^4 \text{ mol g}^{-1}$ for both methods.

Keywords: Ni-LHS, adsorption, coprecipitation, grinding, remazol yellow FG dye