

SINTESIS KARBON AKTIF BERBASIS SEKAM PADI TERAKTIVASI KOH DAN PEMANFAATANNYA SEBAGAI ADSORBEN ION LOGAM Hg (II)

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INTISARI

Dalam penelitian ini telah disintesis karbon aktif dari sekam padi dan pemanfaatannya sebagai adsorben ion logam Hg(II). Karbon aktif berbasis sekam padi disintesis dengan memanfaatkan KOH sebagai agen aktivator setelah dikarbonisasi pada suhu 450 °C dan 600 °C. Karakterisasi adsorben dilakukan dengan FTIR dan SEM. Kajian parameter adsorpsi Hg(II) oleh adsorben karbon aktif (KA) berbasis sekam padi, antara lain optimasi pH, massa adsorben, waktu kontak, dan konsentrasi awal adsorbat. Kandungan Hg(II) dalam filtrat dianalisis dengan *Mercury Analyzer*.

Berdasarkan hasil karakterisasi adsorben, sejumlah pengotor berhasil dihilangkan melalui proses aktivasi dan sintesis. Komponen utama karbon aktif hasil sintesis adalah unsur C sebesar 75,64% dengan situs aktif berupa gugus hidroksil dan karbonil, serta bersifat amorf sesuai hasil FTIR, dan SEM. Adsorpsi optimum Hg(II) oleh KASP terjadi pada pH 5, massa adsorben 0,02 g, waktu kontak 60 menit, dan konsentrasi awal 10 mg L⁻¹. Kinetika adsorpsi Hg(II) oleh KASP mengikuti orde dua semu dengan konstanta laju sebesar 11,55 g mg⁻¹ menit⁻¹. Isoterm adsorpsi mengikuti isoterm Langmuir dengan kapasitas adsorpsi sebesar 4,65 mg g⁻¹ dan energi adsorpsi sebesar 42,39 kJ mol⁻¹.

Kata kunci: adsorpsi, Hg(II), karbon aktif sekam padi, karbonisasi.

***SYNTHESIS OF ACTIVATED CARBON BASED ON KOH-ACTIVATED
RICE HUSK AND ITS USE AS AN ADSORBENT
FOR Hg(II) METAL IONS***

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ABSTRACT

Research on the synthesis of rice husk-based activated carbon and its utilization as an adsorbent for Hg(II) ions has been conducted. Activated carbon from rice husk is synthesized using potassium hydroxide (KOH) as an activating agent following carbonization at temperatures of 450 °C and 600 °C. The characterization of the adsorbent was carried out using FTIR. and SEM. The study of adsorption parameters of Hg(II) by rice husk-based activated carbon adsorbent (AC) included pH optimization, adsorbent mass, contact time, and initial adsorbate concentration. The Hg(II) content in the filtrate was analyzed using Mercury Analyzer.

Based on the results of the adsorbent characterization, a number of impurities were successfully removed through the activation and synthesis process. The main component of the synthesized activated carbon was 75.64% C with active sites in the form of hydroxyl and carbonyl groups, and it exhibited an amorphous nature according to FTIR, and SEM results. The optimum adsorption of Hg(II) by AC occurred at pH 5, an adsorbent mass of 0.02 g, a contact time of 60 minutes, and an initial concentration of 10 mg L⁻¹. The adsorption kinetics of Hg(II) by AC followed a pseudo-second-order model with a rate constant of 11.55 g mg⁻¹ min⁻¹. The adsorption isotherm followed the Langmuir isotherm with an adsorption capacity of 4.65 mg g⁻¹ and an adsorption energy of 42.93 kJ mol⁻¹.

Keywords: *adsorption, Hg(II), rice husk activated carbon, carbonization.*