

ABSTRACT

THE OPTIMIZATION OF PHENANTHRENE COMPOUND ADSORPTION USING NANOSILICA FROM RICE HUSK FUNCTIONALIZED USING DIPHENYLAMINE

By

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Phenanthrene is one of PAHs compound which can be classified as environmental pollutant compounds. In this research, phenanthrene's adsorption test had been done by using nanosilica as an adsorbent which was extracted from rice husk and functionalized with diphenylamine (DPA). Si-DPA adsorbent was characterized by using SEM-EDX to determine the surface morphology, composition of the elements from nanosilica and adsorbent and also FTIR characterization to determine the functional group from both of them.

Adsorption test was done using Batch's method to determine the optimum mass of adsorbent, optimum pH, optimum contact time, and optimum phenanthrene's standard solution concentration variation. It was achieved that the optimum mass of adsorbent was 4 mg, optimum pH was pH 3, optimum contact time was 90 minutes, and optimum phenanthrene standard solution concentration variation was 15,88 ppm. The data of adsorption kinetics of phenanthrene on Si-DPA tended to follow the pseudo second order adsorption kinetics with the value of correlation coefficient (R^2) was 0,938 and phenanthrene's adsorption isotherm on Si-DPA tended to follow Freundlich's isotherm with the value of correlation coefficient (R^2) was 0,845.

Keywords : Nanosilica, rice husk, PAHs, adsorbent, Si-DPA, adsorption, phenanthrene.

ABSTRAK

OPTIMASI ADSORPSI SENYAWA *PHENANTHRENE* MENGGUNAKAN NANOSILIKA DARI SEKAM PADI YANG DIFUNGSIONALISASIKAN MENGGUNAKAN *DIPHENYLAMINE*

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Phenanthrene merupakan salah satu senyawa PAH yang termasuk dalam senyawa polutan lingkungan. Dalam penelitian ini telah dilakukan uji adsorpsi *phenanthrene* menggunakan adsorben nanosilika yang diekstraksi dari sekam padi dan difungsionalisasikan dengan *diphenylamine* (DPA). Adsorben Si-DPA dikarakterisasi dengan SEM-EDX untuk mengetahui morfologi permukaan, komposisi unsur penyusun dari nanosilika dan adsorben tersebut serta FTIR untuk mengetahui gugus fungsi dari keduanya.

Uji adsorpsi pada Si-DPA dilakukan menggunakan metode *Batch* untuk menentukan massa optimum adsorben, pH optimum, waktu optimum, dan variasi konsentrasi larutan standar *phenanthrene* optimum. Massa optimum adsorben yang diperoleh yaitu sebesar 4 mg, pH optimum pada pH 3, waktu kontak optimum selama 90 menit, dan variasi konsentrasi larutan standar *phenanthrene* optimum sebesar 15,88 ppm. Data kinetika adsorpsi *phenanthrene* pada Si-DPA cenderung mengikuti model kinetika adsorpsi pseudo orde dua dengan nilai koefisien korelasi (R^2) sebesar 0,938 dan isoterm adsorpsi *phenanthrene* pada Si-DPA cenderung mengikuti pola isoterm Freundlich dengan nilai koefisien korelasi (R^2) sebesar 0,845

Kata kunci: Nanosilika, sekam padi, PAH adsorben, Si-DPA, adsorpsi, *phenanthrene*.