

PENENTUAN KAPASITAS ADSORPSI DAN ENTALPI ADSORPSI Au(III) OLEH ASAM HUMAT

Mita Lestari
11/312834/PA/13593

INTISARI

Penentuan kapasitas adsorpsi dan entalpi adsorpsi Au(III) oleh asam humat telah dilakukan. Asam humat diisolasi dari tanah gambut Rawa Pening, Ambarawa, Jawa Tengah. Isolasi dilakukan dengan melarutkan tanah gambut pada larutan NaOH 0,1 M dalam kondisi atmosfer nitrogen, kemudian diendapkan dengan penambahan larutan HCl 1 M sampai pH 2. Asam humat dimurnikan dengan cara dilarutkan pada HCl 0,1 M: HF 0,3 M (1:1 v/v). Kapasitas adsorpsi (q_m) dan entalpi adsorpsi (ΔH_{ads}) ditentukan dengan menginteraksikan asam humat dengan larutan Au(III) pada berbagai variasi konsentrasi dan temperatur. Konsentrasi Au(III) dianalisis AAS dan asam humat sebelum dan sesudah interaksi dikarakterisasi menggunakan spektrofotometer FTIR, XRD dan fotomikroskop.

Hasil yang diperoleh menunjukkan bahwa adsorpsi Au(III) oleh asam humat mengikuti model isoterm Langmuir dan termasuk adsorpsi kimia. Kapasitas adsorpsi Au(III) oleh asam humat meningkat dengan adanya kenaikan temperatur. Interaksi yang dilakukan pada temperatur 30, 40, 50, dan 60 °C menghasilkan q_m masing-masing 13,27; 21,88; 34,36 dan 79,37 mg g⁻¹ serta nilai ΔG° berturut-turut 5,67; 3,99; 2,57 dan -2,50 kJ mol⁻¹. Selain itu, data dibuat plot grafik 1/T vs ln K sehingga nilai ΔS° dapat ditentukan yaitu sebesar 255, 41 J mol K⁻¹ dan nilai ΔH° sebesar 83,61 kJ mol⁻¹.

Kata kunci: asam humat, kapasitas, entalpi, adsorpsi, isoterm

DETERMINATION OF ADSORPTION CAPACITY AND ADSORPTION ENTHALPY OF Au(III) BY HUMIC ACIDS

Mita Lestari
11/312834/PA/13593

ABSTRACT

Determination of adsorption capacity and adsorption enthalpy of Au(III) by humic acids has been conducted. Humic acid was isolated from peat soil, Rawa Pening, Ambarawa, Central Java. Isolation was conducted by dissolving peat soil into NaOH 0.1 M solution under nitrogen atmosphere, then precipitated by acidifying it using HCl 1 M until pH = 2. Humic acid was purified by dissolving it into HCl 0.1 M: HF 0.3 M (1:1 v/v). The adsorption capacity and adsorption enthalpy was conducted by interacting humic acid and Au(III) solution at several concentration and temperature. Au(III) concentration was analyzed by using AAS and humic acid both before and after interaction were characterized by using FTIR spectrophotometer, XRD and microscopic photos.

The results obtained show that Au(III) adsorption by humic acid followed Langmuir isotherm models and in the region of chemisorption. The adsorption capacity of Au(III) by humic acid increased with increasing the temperature. Interaction in the temperature 30, 40, 50 and 60 °C obtained q_m 13.27; 21.88; 34.36 and 79.37 mg g⁻¹, respectively also ΔG° values 5.67; 3.99; 2.57 and -2.50 kJ mol⁻¹, respectively. ΔS° and ΔH° values computed from plots of ln K vs 1/T were 255.41 J mol K⁻¹ and 83.61 kJ mol⁻¹, respectively.

Keywords: humic acid, capacity, enthalpy, adsorption, isotherm.