

Ravnoteža adsorpcije Cu- i Ni- iona iz binarnih otopina na humusu Potgrond H

Podrug, Marta

Master's thesis / Diplomski rad

2022

Degree Grantor / Ustanova koja je dodijelila akademski / stručni stupanj: **University of Split, Faculty of Chemistry and Technology / Sveučilište u Splitu, Kemijsko-tehnološki fakultet**

Permanent link / Trajna poveznica: <https://urn.nsk.hr/urn:nbn:hr:167:643255>

Rights / Prava: [In copyright](#)/[Zaštićeno autorskim pravom.](#)

Download date / Datum preuzimanja: **2024-11-22**

Repository / Repozitorij:

[Repository of the Faculty of chemistry and technology - University of Split](#)



TEMELJNA DOKUMENTACIJSKA KARTICA

DIPLOMSKI RAD

Sveučilište u Splitu
Kemijsko-tehnološki fakultet u Splitu
Diplomski studij kemijske tehnologije, smjer: Materijali

Znanstveno područje: Tehničke znanosti

Znanstveno polje: Kemijsko inženjerstvo

Tema rada je prihvaćena na 6. elektroničkoj sjednici Fakultetskog vijeća Kemijsko-tehnološkog fakulteta održanoj 15. i 16. prosinca 2020.

Mentor: Doc. dr. sc. Mario Nikola Mužek

RAVNOTEŽA ADSORPCIJE Cu- I Ni - IONA IZ BINARNIH OTOPINA NA HUMUSU POTGROND H

Marta Podrug, 279

Sažetak: U radu je ispitana adsorpcija bakrovih i niklovih iona na humusu u ovisnosti o različitim početnim koncentracijama otopina bakrovih ($4,814 \text{ mmol dm}^{-3}$, $9,220 \text{ mmol dm}^{-3}$, $13,542 \text{ mmol dm}^{-3}$, $22,695 \text{ mmol dm}^{-3}$, $33,627 \text{ mmol dm}^{-3}$) i niklovih iona ($4,059 \text{ mmol dm}^{-3}$, $8,176 \text{ mmol dm}^{-3}$, $13,471 \text{ mmol dm}^{-3}$, $21,510 \text{ mmol dm}^{-3}$, $31,510 \text{ mmol dm}^{-3}$) pri stalnoj temperaturi od 27°C , brzini miješanja od 180 okr min^{-1} u trajanju od 72 h. Količina adsorbiranih bakrovih iona (q_e) na humusu neznatno raste porastom početne koncentracije bakrovih iona. Količina adsorbiranih niklovih iona (q_e) na humusu raste s porastom početne koncentracije niklovih iona te postiže najvišu vrijednost pri najvišoj početnoj koncentraciji niklovih iona u binarnoj otopini. Porastom početne koncentracije bakrovih iona u otopini smanjuje se učinkovitost adsorpcije koja za najvišu vrijednost početne koncentracije iona u otopini ima vrijednost ispod 10%. Učinkovitost adsorpcije iona nikla na humusu opada s porastom početne koncentracije iona teškog metala u otopini, ali u manjoj mjeri u odnosu na adsorpciju bakrovih iona. Iz dobivenih rezultata proizlazi da najbolje slaganje s eksperimentalnim podacima pokazuje Langmuirov model za adsorpciju bakrovih iona na humusu dok kod adsorpcije niklovih iona na humusu najbolje slaganje pokazuje Freundlichov model.

Ključne riječi: humus, adsorpcija, bakar, nikal, binarne otopine, izoterme

Rad sadrži: 48 stranica, 21 slika, 5 tablica, 54 literaturne reference

Jezik izvornika: hrvatski

Sastav Povjerenstva za obranu:

1. Prof. dr. sc. Sandra Svilović	predsjednica
2. Doc. dr. sc. Franko Burčul	član
3. Doc. dr. sc. Mario Nikola Mužek	član-mentor

Datum obrane: 29. listopada 2021.

Rad je u tiskanom i elektroničkom (pdf format) obliku pohranjen u Knjižnici Kemijsko-tehnološkog fakulteta Split, Ruđera Boškovića 35.

BASIC DOCUMENTATION CARD

DIPLOMA THESIS

University of Split
Faculty of Chemistry and Technology Split
Graduate study of Chemical Technology, Orientation: Materials

Scientific area: Technical sciences

Scientific field: Chemical engineering

Thesis subject was approved by Faculty Council of Faculty of Chemistry and Technology, electronic session no. 6. (December 15th and 16th, 2020)

Mentor: Mario Nikola Mužek, PhD, Assistant Professor

ADSORPTION EQUILIBRIUM OF Cu- AND Ni - IONS FROM BINARY SOLUTIONS ON HUMUS POTGROND H

Marta Podrug, 279

Abstract: In this diploma thesis, the adsorption of copper and nickel ions on humus was studied depending on the different initial concentrations of copper ion (4,814 mmol dm⁻³, 9,220 mmol dm⁻³, 13,542 mmol dm⁻³, 22,695 mmol dm⁻³, 33,627 mmol dm⁻³) and nickel ion solutions (4,059 mmol dm⁻³, 8,176 mmol dm⁻³, 13,471 mmol dm⁻³, 21,510 mmol dm⁻³, 31,510 mmol dm⁻³) at a constant temperature of 27°C, a stirring speed of 180 rpm for 72 h. The amount of copper ions adsorbed on humus (q_e) increases slightly with an increase in the initial concentration of copper ions. The amount of nickel ions adsorbed on humus (q_e) increases with the increase of initial concentration of nickel ions and reaches its maximum value at the highest initial concentration of nickel ions in binary solution. As the initial concentration of copper ions in the solution increases, the adsorption efficiency decreases reaching a value below 10% for the highest initial concentration of ions in the solution. The adsorption efficiency of nickel ions on humus decreases with the increase of initial concentration of heavy metal ions in solution, but to a lesser extent than the adsorption of copper ions. From the results obtained it is evident that the best fitting with the experimental data of copper ions adsorption on humus is reached when Langmuir model was applied, while Freundlich model showed the best fitting for the adsorption of nickel ions on humus.

Keywords: humus, adsorption, copper, nickel, binary solutions, isotherms

Thesis contains: 48 pages, 21 pictures, 5 tables, 54 literary references

Original in: Croatian

Defence Committee:

- | | |
|---|--------------|
| 1. Sandra Svilović, PhD, Full Prof. | chair person |
| 2. Franko Burčul, PhD, Assistant Prof. | member |
| 3. Mario Nikola Mužek, PhD, Assistant Prof. | supervisor |

Defence date: October 29th, 2021

Printed and electronic (pdf format) version of thesis is deposited in Library of Faculty of Chemistry and Technology Split, Ruđera Boškovića 35.

