

INTRODUCTION kinetics of metal ion adsorption from aqueous solutions models algorithms and applications [PDF]

Kinetics of Metal Ion Adsorption from Aqueous Solutions Some Aspects of Ion Adsorption at Planar Interfaces The Nature of Counter-ion Adsorption at the Oxide/water Interface Models for Ion Adsorption on Mineral Surfaces Models for Ion Adsorption on Mineral Surfaces Functional Groups and Ions on Carbon Surfaces Suitable for Ion-adsorption Electrodes Adsorption From Aqueous Solutions Silicate Ion Adsorption on Clays as Related to Phosphate and Hydrogen Ion Concentration Ion Adsorption by Metal Powders Ion-adsorption by Metallic Powders Thermal effects in ion adsorption and ion exchange Applications of Adsorption and Ion Exchange Chromatography in Waste Water Treatment Ion Adsorption by Carborundum from Aqueous Ionic Solutions Ion Adsorption by Some Metal Oxides Ion Adsorption by Some Metal Oxidizers Continuous Countercurrent Ion Adsorption and Stripping Using Ion Exchange Resins ... Ion Adsorption on Oxides Surface Change and Ion Adsorption on Metal Oxides to 290 C. Research on New Ion-adsorption Electrodes for Demineralization of Saline Water Equilibrium, Spectroscopic, and Kinetic Studies of Ion Adsorption at the Oxide/aqueous Interface Metal ion adsorption onto bacteria-mineral composites Ion Adsorption to Goethite-Water Interfaces Comparison of Ion Adsorption to Phosphatidylcholine/phosphatidylserine and Sarcoplasmic Reticulum Membranes Ion Adsorption in Soils from Plynlimon, UK Metal Ion Adsorption Using Silk Fibroin-coated Polypropylene Filters Kinetic and Equilibrium Analysis of Metal Ion Adsorption Onto Bleached and Unbleached Kraft Pulps Influence of Metal Ion Adsorption Equilibrium and Kinetics on the Aggregation of Colloidal Particles Experimental and Modeling Studies on Metal Ion Adsorption Onto Granular Activated Carbon Adsorption of Lead(II) Ions by Organosilicate Nanoporous Materials The Relationship Between the Molecular Structure and Ion Adsorption on Goethite Charging and Ion Adsorption Behaviour of Different Iron (hydr)oxides Charging and Ion Adsorption Behaviour of Different Iron (hydr)oxides, Ph. D. Thesis Adsorption of Inorganic Anions on a Mercury Electrode from Solutions of Formamide Solubility Of, and Hydrogen Ion Adsorption On, Some Metal Oxides in Aqueous Solutions to High Temperatures Water and Ion Adsorption to Goethite Digital Simulation of Ion Adsorption Onto Lipid Membranes Introduction to Adsorption Studies in Electrokinetics with Particular Reference to Ion Adsorption A Discussion on the Leaching Process of the Ion-adsorption Type Rare Earth Ore with the Electrical Double Layer Model Adsorption of Anions on Bismuth Single Crystal Electrodes

List of File kinetics of metal ion adsorption from aqueous solutions models algorithms and applications

Page	Title
1	Some Aspects of Ion Adsorption at Planar Interfaces
2	The Nature of Counter-ion Adsorption at the Oxide/water Interface
3	Models for Ion Adsorption on Mineral Surfaces
4	Models for Ion Adsorption on Mineral Surfaces
5	Functional Groups and Ions on Carbon Surfaces Suitable for Ion-adsorption Electrodes
6	Adsorption From Aqueous Solutions
7	Silicate Ion Adsorption on Clays as Related to Phosphate and Hydrogen Ion Concentration
8	Ion Adsorption by Metal Powders
9	Ion-adsorption by Metallic Powders
10	Thermal effects in ion adsorption and ion exchange
11	Applications of Adsorption and Ion Exchange Chromatography in Waste Water Treatment
12	Ion Adsorption by Carborundum from Aqueous Ionic Solutions
13	Ion Adsorption by Some Metal Oxides
14	Ion Adsorption by Some Metal Oxides
15	Continuous Countercurrent Ion Adsorption and Stripping Using Ion Exchange Resins ...
16	Ion Adsorption on Oxides
17	Surface Change and Ion Adsorption on Metal Oxides to 290 C.
18	Research on New Ion-adsorption Electrodes for Demineralization of Saline Water
19	Equilibrium, Spectroscopic, and Kinetic Studies of Ion Adsorption at the Oxide/aqueous Interface

Page	Title
20	Metal ion adsorption onto bacteria-mineral composites
21	Ion Adsorption to Goethite-Water Interfaces
22	Comparison of Ion Adsorption to Phosphatidylcholine/phosphatidylserine and Sarcoplasmic Reticulum Membranes
23	Ion Adsorption in Soils from Plynlimon, UK
24	Metal Ion Adsorption Using Silk Fibroin-coated Polypropylene Filters
25	Kinetic and Equilibrium Analysis of Metal Ion Adsorption Onto Bleached and Unbleached Kraft Pulps
26	Influence of Metal Ion Adsorption Equilibrium and Kinetics on the Aggregation of Colloidal Particles
27	Experimental and Modeling Studies on Metal Ion Adsorption Onto Granular Activated Carbon
28	Adsorption of Lead(II) Ions by Organosilicate Nanoporous Materials
29	The Relationship Between the Molecular Structure and Ion Adsorption on Goethite
30	Charging and Ion Adsorption Behaviour of Different Iron (hydr)oxides
31	Charging and Ion Adsorption Behaviour of Different Iron (hydr)oxides, Ph. D. Thesis
32	Adsorption of Inorganic Anions on a Mercury Electrode from Solutions of Formamide
33	Solubility Of, and Hydrogen Ion Adsorption On, Some Metal Oxides in Aqueous Solutions to High Temperatures
34	Water and Ion Adsorption to Goethite
35	Digital Simulation of Ion Adsorption Onto Lipid Membranes
36	Introduction to Adsorption
37	Studies in Electrokinetics with Particular Reference to Ion Adsorption
38	A Discussion on the Leaching Process of the Ion-adsorption Type Rare Earth Ore with the Electrical Double Layer Model
39	Adsorption of Anions on Bismuth Single Crystal Electrodes

Kinetics of Metal Ion Adsorption from Aqueous Solutions 2013-11-27

this monograph is intended to provide a systematic presentation of theories concerning the adsorption of metal ions from aqueous solutions onto surfaces of natural and synthetic substances and to outline methods and procedures to estimate the extent and progress of adsorption as heavy metals and the problems associated with their transport and distribution are of serious concern to human health and the environment the materials presented in this volume have both theoretical and practical significance in writing this monograph one of our goals was to prepare a book useful to environmental workers and practicing engineers for this reason our presentation relies heavily on concepts commonly used in the environmental engineering literature in fact the volume was prepared for readers with a basic understanding of environmental engineering principles and some knowledge of adsorption processes no prior familiarity with the ionic solute adsorption at solid solution interfaces is assumed instead introduction of the necessary background information was included generally speaking metal ion adsorption may be studied in terms of three distinct but interrelated phenomena surface ionization complex formation and the formation and presence of an electrostatic double layer adjacent to adsorbent surfaces analyses of these phenomena with various degrees of sophistication are xviii adsorption of metal ions from aqueous solutions presented and their various combinations yield different models that describe metal ion adsorption

Some Aspects of Ion Adsorption at Planar Interfaces 1982

adsorption from aqueous solutions is important in many technological areas like water purification mineral beneficiation soil conservation detergency and many areas of biology recently adsorption of radionuclides from aqueous solutions has become the focus of attention in assessing the movement of radionuclides through a geologic medium from underground radioactive waste repositories this volume provides a multidisciplinary overview of current work in the area of adsorption from aqueous solutions and reviews the progress that has been made in the theoretical models for assessing adsorption adsorption of heavy metal ions and the effect of complex formation is treated extensively as are the effects of surface chemical properties of the adsorbent solution pH and thermodynamic parameters important in the adsorption process adsorption of pesticides and organic polymeric species on different adsorbents are included and implications of adsorption of ions on dental materials are discussed also included are studies of the adsorption of radionuclides by geologic media under environmental conditions the study of the chemical nature of the adsorbed species at the surface by x ray photoelectron spectroscopy which often provides mechanistic information for the adsorption process is included for adsorbed metal ions on clay and mineral surfaces

kinetics of metal ion
adsorption from aqueous
solutions models
algorithms and
applications

The Nature of Counter-ion Adsorption at the Oxide/water Interface 1986

the ion exchange process is a natural phenomenon and mankind has been using this technique since the early days of civilisation with the progress of technologies and concepts we got a better understanding of this technique and increased its application horizon like in other research areas nanotechnology has also penetrated heavily into this field and has helped develop smart materials with better properties for application in adsorption and ion exchange chromatography a large amount of research was carried out in this field in the last few decades showing the importance of these materials and technologies water treatment is receiving great attention worldwide due to the increasing demand of drinking water and hence the need to recycle polluted water sources keeping this importance in mind this book applications of adsorption and ion exchange chromatography in waste water treatment has been edited with contributions from well know experts in the field who have been working on different ion exchange materials and technologies for many years

Models for Ion Adsorption on Mineral Surfaces 1973

most metal ions have negative impacts on pulp mill operations the concentrations of metal ions on pulp fibers and in washwaters rise significantly with increased wastewater recycling the development of technology to remove these metal ions requires an understanding of how metal ions are bound to pulp components it is also desirable to predict distribution of metal ions between the pulp fibers and the washwaters the adsorption isotherms for eight metal ions ca ba mn zn pb cd ni na were measured on bleached and unbleached brownstock kraft pulps at neutral ph and temperatures ranging from 25 to 75 c on bleached pulps the metal ion adsorption increased rapidly with increasing metal ion concentration in solution and then leveled off at neutral ph the adsorption on bleached pulp was stoichiometric to the carboxylate sites whereas the adsorption on unbleached pulp was not especially at high metal ion concentration in solution and low temperature the ph isotherms specify the adsorption isotherms of sodium and calcium on wood pulps as ph ranging from 2.5 to 11.0 the ph isotherms on bleached pulp with only cooh functional groups pk subscript a of 3.77 were saturated at ph 4 and above whereas those on brownstock pulp with both cooh and phoh pk subscript a of 10 functional groups increased in two steps at ph 4 and 8 the brownstock pulp is heterogeneous material therefore only the empirical freundlich model was applied to the data to predict the metal ion adsorption on bleached pulps two fundamental equilibrium models were developed the multi component ion exchange and the donnan equilibrium models the ion exchange model better predicts the metal adsorption at neutral ph whereas the donnan equilibrium model more accurately predicts the ph isotherms the adsorption kinetics of ba²⁺ and ni²⁺ were measured on wood pulps as a function of mixing speed initial metal ion concentration and temperature the adsorption of metal ions reached equilibrium rapidly the intraparticle diffusion model based on aqueous principle with a linear relationship assumption between adsorbed and free

2017-03-04 5/12

algorithms and applications

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metal ion concentration satisfactorily predicted the adsorption kinetics at low metal ion concentration in solution

Models for Ion Adsorption on Mineral Surfaces 1973

as synthesized organosilicate nanoporous osnp materials hms hexagonal mesoporous structure and mcm 41 were used as adsorbents for removal of lead ii ions in laboratory batch and column studies mesoporous organosilicates were prepared from tetraethylorthosilicate teos and either an ionic cetyltrimethyl ammonium or neutral dodecylamine surfactant batch reaction distribution coefficients for mcm 41 were $k_d = 51.5 \text{ l/g}$ and $k_d = 26.3$ at 24 h and $k_d = 73.7 \text{ l/g}$ and $k_d = 40.5$ at 7 d osnp lead ii ion adsorption increased from ph 3 until ph ca 7.5 after which a sharp decrease in adsorption was noted osnp materials reflected a dependence on ionic strength consistent with an outer sphere complexation and electrostatic bonding mechanism lead ii ion adsorption behavior in seven matrix batch solutions was not effective possibly due to soluble complexes that were formed that prevented adsorption and precipitation there was no difference in the batch adsorption performance of mcm 41 and hms column designs were optimized by response surface methods osnp material sand media head loss at a superficial velocity 0.49 m/h increased 28 l compared with sand only media at column break through defined as $C_e/C_0 = 0.5$ mcm 41 sand media $k_d = 46.2 \text{ l/g}$ and sand only $k_d = 0.04 \text{ l/g}$ there was significant evidence to warrant rejection of the claim that the variances in k_d were equal p

Functional Groups and Ions on Carbon Surfaces Suitable for Ion-adsorption Electrodes 1968

a theory of hydromagnetic ionizing waves has been developed which is valid in the region in which gas pressure is negligible compared with magnetic pressure the theory takes into account the energy expended in partial ionization of the gas behind the wave the usual high conductivity boundary condition behind the wave is not employed the electric field in front of the wave is taken as a parameter results of this theory are compared with available experimental measurements and show good agreement author

Adsorption From Aqueous Solutions 2012-12-06

solubility of boehmite Al(OH)_3 ferrous hydroxide Fe(OH)_2 magnetite Fe_3O_4 zincite ZnO and brucite Mg(OH)_2 were measured over a range of temperatures Al(OH)_3 100 290 c Fe(OH)_2 Fe_3O_4 100 250 c ZnO 50 290 c Mg(OH)_2 60 200 c using in situ ph measurements a hydrogen electrode concentration cell was used the ph range depended on the oxide the solubility results for boehmite mainly demonstrate the method viability while those for zincite are mainly restricted to mildly acidic to neutral ph where Zn^{2+} predominates in solution the magnetite presumably coated with Fe(OH)_2 solubilities extend from phs 5 and because of relevance to water steam cycles of power plants are compared in detail with previous studies the same cell was used to investigate the surface adsorption desorption thermodynamics of metal ion adsorption from aqueous solutions models algorithms and applications
2017-03-04 6/12

kinetics of metal ion adsorption from aqueous solutions models algorithms and applications
~~function of temperature and application of the stern 3 layer model were~~
determined for this solid the zincite study is still incomplete preliminary results show trends that can be rationalized only qualitatively now with the zero point of charge being apparently affected by hydration of the surface in basic solutions and specific adsorption of na ions under the same conditions

Silicate Ion Adsorption on Clays as Related to Phosphate and Hydrogen Ion Concentration 1955

introduction to adsorption basics analysis and applications presents adsorption basics that are relevant and essential to its application including data analysis interpretation and design calculations the book deliberately keeps background information to a minimum instead comprehensively covering adsorption of liquid solutions the difference between equilibrium individual solute uptake and surface excess a general discussion of adsorbate uptake mechanisms and uptake rate expression uptake steps performance models and their generalizations application of performance models and design methods based on the constant behavior assumption and unused bed length concept includes adsorption basics and their applications discusses gas adsorption equilibrium and equilibrium of liquid adsorption gives the various steps of adsorbate uptake and their combination to yield adsorbate uptake rate expression presents both rational and empirical design for adsorption processes highlights common mistakes found in recent adsorption publications

Ion Adsorption by Metal Powders 1958

Ion-adsorption by Metallic Powders 1959

Thermal effects in ion adsorption and ion exchange 1962

Applications of Adsorption and Ion Exchange Chromatography in Waste Water Treatment 2017-06-01

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