

A. R. Despić

**Electrochemistry/Colloid Chemistry Interaction: (a) Effect of Particle Size on Electrokinetic Phenomena and Coagulation; (b) Anodic Deposition of Colloidal Metal**

Thermodynamic treatment of metal colloid particles shows that the electrochemical potential depends on particle radius. The difference in zeta-potential may be very significant towards the lower limit of the colloidal range. A quantitative treatment based on the Stern model of the electrical double layer shows the effect to be the strongest around the *pzc* and subsides towards high positive or negative potential. The iso-electric point, rate of coagulation and electrophoretic mobility are also dependent on the particle radius. Deposition of metal from colloidal solution has also been investigated. It was shown that the negatively charged gold particles deposit at the anode . . . . .

553—561

F. M. Etzler and  
W. Drost-Hansen**Recent Thermodynamic Data on Vicinal Water and a Model for Their Interpretation**

The properties and thermodynamic parameters are reviewed for vicinal water, the existence of which is confirmed in most interfacial systems regardless of the chemical nature of the surface. . . .

563—592

W. Stumm,  
G. Furrer, and  
B. Kunz**The Role of Surface Coordination in Precipitation and Dissolution of Mineral Phases**

In heterogeneous nucleation, crystal-forming ions interact by surface coordination with the surface sites of the heteronuclei or template. The dissolution of oxides and other minerals depends on the influence of surface complexforming li-

	gands and on the degree of surface protonation . . . . .	593—611
<b>E. Tipping, J. R. Griffith and J. Hilton</b>	<b>The Effect of Adsorbed Humic Substances on the Uptake of Copper(II) by Goethite</b> Adsorbed humic substances enhance the uptake of Cu(II) by goethite particles, to a greater extent than would be predicted for the simple transfer of humic Cu-binding sites to the particulate phase . . .	613—621
<b>B. Vincent</b>	<b>Weak, Reversible Flocculation Phenomena in Sterically-stabilised Dispersions</b> It is demonstrated, both theoretically and experimentally, that the two basic parameters controlling the onset and extent of flocculation in sterically-stabilised dispersions are the particle concentration and the depth of the pairwise interaction (free) energy minimum. It is also shown that the latter parameter is itself controlled, inter alia, by the thickness of the adsorbed polymer sheath, the solvency and the concentration of free polymer in solution . . . . .	623—631
<b>A. C. Zettlemoyer P. Pendleton F. J. Micale</b>	<b>A Study of the Mechanism of Micropore Filling. I. Molecular Sieve Effects</b> The adsorptive properties of two microporous carbons and a microporous silica were best described by a Dubinin-Astakhov equation and a two-term Dubinin-Radushkevich equation, respectively. Pore filling was via an ordered process of micropore then super-micropore adsorption . . . . .	633—648
<b>E. Matijević and N. Kallay</b>	<b>Kinetics of Deposition of Colloidal Metal Oxide Particles on a Steel Surface</b> Theoretical Interpretation of data obtained by packed column techniques. The effect of surface saturation is considered	649—661
<b>B. R. Jennings and R. C. Fairwood</b>	<b>Electric Birefringence and Electrophoretic Light Scattering for Colloid Stability Characterisation</b> A novel light scattering apparatus has been developed in which mineral sols are subjected to electric fields as increasing	

	amounts of surfactant are added. The electrical parameters are considered as indicators of sol-stability. . . . .	663—671
<b>E. Killmann</b>	<b>The Stability of Silica Hydrosols Under the Influence of Polymer Adsorption</b>	
	The stability behaviour of hydrous Silica suspensions, flocculated by polyethylene-glycol adsorption has been characterized quantitatively by parameters from turbidity, sedimentation and rheology measurements . . . . .	673—694
<b>B. C. Bonekamp, H. A. van der Schee, and J. Lyklema</b>	<b>Adsorption of Oligo- and Polypeptides as Model Polyelectrolytes</b>	
	The effects of charge, chain length, pH, and ionic strength on the adsorption of polylysines on silver iodide and polystyrene latex were studied and a lattice theory was presented to account for the trends observed . . . . .	695—704
<b>W. Norde</b>	<b>The Role of Charged Groups in the Adsorption of Proteins at Solid Surfaces</b>	
	The adsorption of human plasma albumin and bovine pancreas ribonuclease at various surfaces is compared. Special attention is paid to the charge transfer during the adsorption process. Small ions from solution are incorporated in the adsorbed layer in order to prevent the accumulation of net charge in the low dielectric proteinaceous environment . . . . .	705—720
<b>H. Füredi-Milhofer</b>	<b>Precipitation and Interfacial Phenomena in Biological Mineralization. Introductory Remarks</b>	
	A review concerning the physico-chemical aspects of some forms of biological mineralization, i. e. normal mineralization of bone and teeth, the formation of dental calculus and caries and urolithiasis is presented. Problems associated with the mechanisms of the deposition and dissolution of the mineral phases under normal and pathological conditions are identified and methods for their solution discussed. The results of physico-chemical studies are related to the findings and theories based on investigations of biological material. . . . .	721—740

G. H. Nancollas

**The Mechanism of Precipitation of Biological Minerals. The Phosphates, Oxalates and Carbonates of Calcium**

The results of constant composition crystallization kinetics studies are in accordance with surface controlled reactions reflecting either spiral growth or polynuclear mechanisms. Traces of inhibitors may stabilize otherwise thermodynamically unstable phases . . . . .

741—752

J. L. Meyer

**Phase Transformations in the Spontaneous Precipitation of Calcium Phosphate**

The available chemical, morphological, kinetic, and thermodynamic evidence suggests that the formation of hydroxyapatite by spontaneous precipitation in the pH range 7.0—9.25 proceeds via the nucleation of octacalcium phosphate on a well defined amorphous calcium phosphate phase . . . . .

753—767

J. Christoffersen,  
M. R. Christoffersen,  
and J. Arends

**Dissolution of Calcium Hydroxylapatite and its Application to Biological Demineralization**

The rate of dissolution of calcium hydroxylapatite in aqueous solution is controlled by a surface nucleation process, which various foreign ions can affect. Citrate ions are found to inhibit the dissolution process at low concentration, but accelerate this process at higher concentrations

769—777

W. E. Brown,  
L. C. Chow, and  
M. Mathew

**Thermodynamics of Hydroxylapatite Surfaces**

A new model for equilibria at the interface of sparingly soluble crystal is reviewed. Three types of equilibrium transport processes, stoichiometric, Gibbsian and electrochemical, and their potential application are discussed . . . . .

779—787

J. P. Kratochvil,  
T. M. Aminabhavi,  
W. P. Hsu,  
S. Fujime,  
A. Patkowski,  
F. C. Chen, and  
B. Chu

**Hydrodynamic Properties of Micelles of Dihydroxy Bile Salts: Sodium Taurodeoxycholate and Sodium Glycodeoxycholate**

A pronounced increase of the micellar size in aqueous 0.15 m NaCl solutions of conjugated dihydroxy bile salts between the

critical micelle concentration and approximately ten times higher concentration was demonstrated by measuring the translation diffusion coefficient, the sedimentation coefficient and the intensity of scattered light. At even higher concentrations of bile salts the effects of the hydrodynamic and the thermodynamic interactions on the measured parameters become very pronounced . . . . .

789—796

**D. Bratko,  
J. Cerkvenik,  
J. Špan, and  
G. Vesnaver**

**Osmometric Study of Aggregation in Dye Solutions**

The concentration dependence of the degree of aggregation of the dyes C. I. Direct Red 28, C. I. Direct Blue 1, C. I. Acid Red 18, and C. I. Acid Red 88 was determined on the basis of the vapour pressure osmometric data, interpreted in terms of the cell model of dye solutions

797—801

**H. H. Trimm and  
B. R. Jennings**

**The Study of Cartilage Proteoglycan Interactions by Electric Birefringence**

The size and interactions of the three major cartilage components, proteoglycan, hyaluronic acid, and collagen have been studied . . . . .

803—808

**P. G. Neeson,  
B. R. Jennings,  
and G. J. T. Tiddy**

**An Electric Birefringence Study of Aqueous Tetraethyleneglycol Dodecyl Ether Micelles**

Measurements of the birefringence amplitude induction and decay rates for these systems have been made in the  $L_1$  micellar phase at various temperatures and surfactant compositions. Changes in micelle geometry interaction characteristics have been observed . . . . .

809—815

CROATICA  
CHEMICA ACTA

Croat. Chem. Acta Vol. 56 No. 4

553—816 A7—A22 C5—C10  
XIII—XXIV (1983)

Zagreb, 9. studeni, 1983

## SADRŽAJ

Referati s VI Međunarodne ljetne konferencije Instituta Ruder Bošković

## KEMIJA MEĐUPOVRŠINA KRUTO/TEKUĆE

Međuovisnost elektrohemije i koloidne hemije . . . . .	<b>A. R. Despić</b>	553—561
Novi termodinamički podaci o vicinalnoj vodi sa modelom za njihovu interpretaciju . . . . .	<b>F. M. Etzler i W. Dröst-Hansen</b>	563—592
Uloga površinske koordinacije pri taloženju i otapanju mineralnih faza . . . . .	<b>W. Stumm, G. Furrer i B. Kunz</b>	593—611
Efekt adsorpcije humusnih tvari na vezivanje bakra(II) s getitom <b>E. Tipping, J. R. Griffith, and J. Hilton</b>		613—621
Fenomeni slabe interakcije i reverzibilne flokulacije u sterički stabiliziranim disperzijama . . . . .	<b>B. Vincent</b>	623—631
Istraživanja mehanizma zapunjanja mikropora. I. Efekti molekulskih sita . . . . .	<b>A. C. Zetlemoyer, P. Pendleton i F. J. Micale</b>	633—648
Kinetika prijanjanja koloidnih čestica metalnih oksida na površinu čelika . . . . .	<b>E. Matijević i N. Kallay</b>	649—661
Električki dvolom i elektroforetsko raspršenje svjetla kao karakterizacija koloidne stabilnosti . . . . .	<b>B. R. Jennings i R. C. Fairwood</b>	663—671
Stabilnost hidrosolova SiO <sub>2</sub> pod utjecajem adsorpcije polimera . . . . .	<b>E. Killmann</b>	673—694
Adsorpcija oligo- i polipeptida kao modela za polielektrolite . . . . .	<b>B. C. Bonekamp, H. A. van der Schee i J. Lykiema</b>	695—704
Utjecaj nabijenih skupina na adsorpciju proteina na čvrstim površinama . . . . .	<b>W. Norde</b>	705—720

## Međunarodni simpozij

TALOŽENJE I MEĐUPOVRŠINSKE POJAVE KOD MINERALIZACIJE U  
BIOLOŠKIM I BIOPOLIMERNIM MATRICAMA

Taloženje i međufazne pojave u biološkoj mineralizaciji. Uvodne napomene . . . . .	<b>H. Füredi-Milhofer</b>	721—740
Mehanizam taloženja bioloških minerala. Fosfati, oksalati i karbonati kalcija . . . . .	<b>G. H. Nancollas</b>	741—752
Fazna pretvorba pri spontanom taloženju kalcij-fosfata . . . . .	<b>J. L. Meyer</b>	753—767
Studij otapanja kalcij-hidroksiapatita i njegova primjena na biološku demineralizaciju . . . . .	<b>J. Christoffersen, M. R. Christoffersen i J. Arends</b>	769—777

Termodinamika površina hidroksiapatita ... <b>W. E. Brown, L. C. Chow i M. Mathew</b>	779—787
Hidrodinamička svojstva micela dihidroksižučnih kiselina: Natrijev tauro- deoksiholat i natrijev glikodeoksiholat ... <b>J. P. Kratochvil, T. M. Aminabhavi, W. P. Hsu, S. Fujime, A. Patkowski, F. C. Chen i B. Chu</b>	789—796
Osmometrična raziskava agregacije v raztopinah barvih ... <b>D. Bratko, J. Cerkvenik, J. Špan in G. Vesnaver</b>	797—801
Proučavanje interakcije hrskavičnih proteoglikana s pomoću električnog dvoloma ... <b>H. H. Trimm i B. R. Jennings</b>	803—808
Proučavanje tetraetilenglikol-dodecileterskih micela u vodenom mediju s pomoću električnog dvoloma ... <b>P. G. Neeson, B. R. Jennings i G. J. T. Tiddy</b>	809—815
	<i>Prilozi</i>
Zapisnik redovite godišnje skupštine Hrvatskog kemijskog društva	A7—A22
Obavijesti	C5—C8
Zahvala recenzentima	C9
Errata	C10
Sadržaj: Croatica Chemica Acta vol. 56	XIII—XXIV

CROATICA  
CHEMICA ACTA

Croat. Chem. Acta Vol. 56 No. 4

553—816 A7—A22 C5—C10  
XIII—XXIV (1983)

Zagreb, November 9, 1983

The contents of CCA may be reproduced citing the original form  
in any medium without prior permission

## CONTENTS

*Proceedings of the 6th »Ruder Bošković« Institute's International Summer Conference*

## CHEMISTRY OF SOLID/LIQUID INTERFACES

Introductory Remarks	. . . Velimir Pravdić	I
Electrochemistry/Colloid Chemistry Interaction: (a) Effect of Particle Size on Electrokinetic Phenomena and Coagulation: (b) Anodic Deposition of Colloidal Metal	. . . A. R. Despić	553—561
Recent Thermodynamic Data on Vicinal Water and a Model for Their Interpretation . . . . .	F. M. Eizler and W. Drost-Hansen	563—592
The Role of Surface Coordination in Precipitation and Dissolution of Mineral Phases . . . . .	W. Stumm, G. Furrer and B. Kunz	593—611
The Effect of Adsorbed Humic Substances on the Uptake of Copper(II) by Goethite . . . . .	E. Tipping, J. R. Griffith and J. Hilton	613—621
Weak, Reversible Flocculation Phenomena in Sterically-stabilised Dispersions	. . . B. Vincent	623—631
A Study of the Mechanism of Micropore Filling. I. Molecular Sieve Effects	. . . A. C. Zettlemoyer, P. Pendleton and F. J. Micale	633—648
Kinetics of Deposition of Colloidal Metal Oxide Particles on a Steel Surface	. . . E. Matijević and N. Kailay	649—661
Electric Birefringence and Electrophoretic Light Scattering for Colloid Stability Characterisation . . . .	B. R. Jennings and R. C. Fairwood	663—671
The Stability of Silica Hydrosols Under the Influence of Polymer Adsorption	. . . E. Killmann	673—694
Adsorption of Oligo- and Polypeptides as Model Polyelectrolytes	. . . B. C. Bonekamp, H. A. van der Schee and J. Lyklema	695—704
The Role of Charged Groups in the Adsorption of Proteins at Solid Surfaces	. . . W. Norde	705—720

(Continued on inside back cover)

(Continued from outside back cover)

*International Symposium*

PRECIPITATION AND INTERFACIAL PHENOMENA IN MINERALIZATION IN  
BIOLOGICAL AND BIOPOLYMER MATRICES

Precipitation and Interfacial Phenomena in Biological Mineralization. Introductory Remarks . . . <b>H. Füredi-Milhofer</b>	721—740
The Mechanism of Precipitation of Biological Minerals. The Phosphates, Oxalates and Carbonates of Calcium . . . . . <b>G. H. Nancollas</b>	741—752
Phase Transformations in the Spontaneous Precipitation of Calcium Pho- sphate . . . . . <b>J. L. Meyer</b>	753—767
Dissolution of Calcium Hydroxylapatite and its Application to Biological Demineralization . . . <b>J. Christoffersen, M. R. Cristoffersen and J. Arends</b>	769—777
Thermodynamics of Hydroxyapatite Surfaces . . . <b>W. E. Brown, L. C. Chow, and M. Mathew</b>	779—787
Hydrodynamic Properties of Micelles of Dihydroxy Bile Salts: Sodium Taurodeoxycholate and Sodium Glycodeoxycholate . . . <b>J. P. Kratochvil, T. M. Aminabhavi, W. P. Hsu, S. Fujime, A. Paikowski, F. C. Chen, and B. Chu</b>	789—796
Osmometric Study of Aggregation in Dye Solutions . . . <b>D. Bratko, J. Cerkvenik, J. Špan and G. Vesnaver</b>	797—801
The Study of Cartilage Proteoglycan Interactions by Electric Birefringence . . . <b>H. H. Trimm and B. R. Jennings</b>	803—808
An Electric Birefringence Study of Aqueous Tetraethyleneglycol Dodecyl Ether Micelles . . . <b>P. G. Neeson, B. R. Jennings and G. J. T. Tidý</b>	809—815
	<i>Appendix</i>
Minutes of the Meeting of the Croatian Chemical Society (in Croatian)	A7—A22
Announcement	C5—C8
Acknowledgement to Referees	C9
Errata	C10
Contents: Croatica Chemica Acta Vol. 56	XIII—XXIV