
Contents

Chapter 1

Hydrological and Geochemical Processes Controlling the Fate and Transport of Contaminants in Fractured Bedrock	1
<i>Philip M. Jardine, Tonia L. Mehlhorn, Y. Roh, and William E. Sanford</i>	

Chapter 2

Mineral Controls in Colloid-Mediated Transport of Metals in Soil Environments	25
<i>A.D. Karathanasis</i>	

Chapter 3

A Web-Based Three-Dimensional Simulation System for Solute Transport in Soil	51
<i>Honghai Zeng, Vladimir J. Alarcon, William L. Kingery, H. Magdi Selim, and Jianping Zhu</i>	

Chapter 4

Effect of Structural Charges on Proton Adsorption at Clay Surfaces	79
<i>Marcelo J. Avena and Carlos P. De Pauli</i>	

Chapter 5

Molecular Modeling of Fulvic and Humic Acids: Charging Effects and Interactions with Al^{3+} , Benzene, and Pyridine	113
<i>James D. Kubicki and Chad C. Trout</i>	

Chapter 6

Silicon-Organic Interactions in the Environment and in Organisms	145
<i>Nita Sahai</i>	

Chapter 7

Formation of Biogenic Manganese Oxides and Their Influence on the Scavenging of Toxic Trace Elements	169
<i>Yarrow M. Nelson and Leonard W. Lion</i>	

Chapter 8

Zinc Speciation in Contaminated Soils Combining Direct and Indirect Characterization Methods	187
<i>Darryl Roberts, Andreas Scheinost, and Donald L. Sparks</i>	

Chapter 9

Reduction/Cation Exchange Model of the Coincident Release of Manganese
and Trace Metals following Soil Reduction229
Dean M. Heil, Grant E. Cardon, and Colleen H. Green

Chapter 10

Behavior of Heavy Metals in Soil: Effect of Dissolved Organic Matter245
Lixiang X. Zhou and J.W.C. Wong

Chapter 11

Analytical Techniques for Characterizing Complex Mineral Assemblages:
Mobile Soil and Groundwater Colloids271
John C. Seaman, M. Guerin, B.P. Jackson, P.M. Bertsch, and J.F. Ranville

Chapter 12

Kinetic Modeling of Sulfate Transport in a Forest Soil311
H. Magdi Selim, George R. Gobran, Ximing Guan, and Nicholas Clarke

Chapter 13

Solubility of Fluoride in Semi-Arid Environments331
*K.J. Reddy, Michelle M. Patterson, J. Daniel Rodgers, Richard E. Jackson, and
Barry L. Perryman*

Index.....351