

Contents

<i>List of Contributors</i>	<i>page</i> vii
<i>Foreword</i>	xi
<i>Kurt O. Konhauser</i>	
Part I. Standard Techniques in Geomicrobiology	1
1. General Geochemistry and Microbiology Techniques	3
Sarrah M. Dunham-Cheatham and Yaqi You	
Part II. Advanced Analytical Instrumentation	61
2. The Application of Isothermal Titration Calorimetry for Investigating Proton and Metal Interactions on Microbial Surfaces	63
Drew Gorman-Lewis	
3. Potentiometric Titrations to Characterize the Reactivity of Geomicrobial Surfaces	79
Daniel S. Alessi, Shannon L. Flynn, Md. Samrat Alam, Leslie J. Robbins, and Kurt O. Konhauser	
4. Use of Multi-collector ICP-MS for Studying Biogeochemical Metal Cycling	93
Kai Liu, Lingling Wu, and Sherry L. Schiff	
Part III. Imaging Techniques	119
5. Scanning Probe Microscopy	121
Adam F. Wallace	
6. Applications of Scanning Electron Microscopy in Geomicrobiology	148
Jeremiah Shuster, Gordon Southam, and Frank Reith	
7. Applications of Transmission Electron Microscopy in Geomicrobiology	166
Jeremiah Shuster, Frank Reith, and Gordon Southam	

8. Whole Cell Identification of Microorganisms in Their Natural Environment with Fluorescence <i>in situ</i> Hybridization (FISH)	187
Natuschka M. Lee	
Part IV. Spectroscopy	
9. X-ray Diffraction Techniques	215
Daniel K. Unruh and Tori Z. Forbes	
10. Application of Synchrotron X-ray Absorption Spectroscopy and Microscopy Techniques to the Study of Biogeochemical Processes	238
Maxim I. Boyanov and Kenneth M. Kemner	
11. Bacterial Surfaces in Geochemistry – How Can X-ray Photoelectron Spectroscopy Help?	262
Madeleine Ramstedt, Laura Leone, and Andrey Shchukarev	
12. Applications of Fourier-transform Infrared Spectroscopy in Geomicrobiology	288
Janice P. L. Kenney and András Gorzsás	
13. Mössbauer Spectroscopy	314
James M. Byrne and Andreas Kappler	
Part V. Microbiological Techniques	
14. Lipid Biomarkers in Geomicrobiology: Analytical Techniques and Applications	341
Jiasong Fang, Shamik Dasgupta, Li Zhang, and Weiqiang Zhao	
15. Phylogenetic Techniques in Geomicrobiology	360
Denise M. Akob, Adam C. Mumford, Darren S. Dunlap, and Amisha T. Poret-Peterson	
<i>Index</i>	405