Preface

Metal respiration is an exciting research field. Researchers with various scientific backgrounds and interests have developed hypotheses and proven concepts that allowed the identification of mechanisms and the evaluation of implications of microbial metal respiration. This includes the biochemistry of this respiratory process, the environmental impact on soils and sediments, mineral transformation and the potential application in remediation and even microbial fuel cell development. The interdisciplinary character of this research field should be motivation for students to get involved in this field, since they have the opportunity to experience different ways of thinking and to learn methods from molecular biology to synchrotron radiation-based analyses.

In this field we generally build on the initial work of microbiologists who were open enough to believe that rock respiration is possible, which led to the first isolation of metal reducing bacteria. In this book the editors brought together "second or third generation" experts studying metal respiration, building on the initial work done in the 1980s. In different chapters, we cover a substantial amount of what we know about the mechanisms and applications of microbial metal respiration. We are aware that certain aspects such as metal reduction by Archaea and Gram-positive microorganisms are only insufficiently covered, which is mostly due to the limited amount of knowledge we have so far in these research directions. Nevertheless, future editions will most probably include chapters about the biochemistry of Archaeal and Gram-positive metal reduction, and the environmental influence of these organisms, as well as their influence on the formation of (secondary) minerals.

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