

Metal-Reducing Bacteria: Diversity and Biomineralization

Yul Roh*, Yumi Kim, Hyunhee Seo, Mi-jin Jung, Bitna Park, Yuri Lee, and Eunyoung Sun

Department of Earth Systems & Environmental Sciences, Chonnam National University, Gwangju 500-757

Metal reducing bacteria play important roles in the cycling of metals such as iron(III), manganese(VI), and organic matter in natural environments as well as precipitate or transform amorphous or crystalline Fe(III) oxides into crystalline iron phases and other minerals. The objective of this presentation summarizes recent researches on the diversity of metal-reducing bacteria isolated or enriched from diverse subsurface environments and variety of biominerals formed by the bacteria. Phylogenetic analysis indicates that the metal-reducing bacteria isolated or enriched from diverse subsurface environments were closely related to the members of *Shewanella* genus, *Geobacter* genus, *Clostridium* genus, *A. transvaalensis*, *T. ethanolicus*, and others. The metal-reducing bacteria can oxidize short fatty acids and precipitate or transform amorphous or crystalline Fe(III) oxides into crystalline iron phases such as magnetite, siderite, vivianite, maghemite, and green rust. The bacteria also precipitate uraninite, chromium hydroxide, silver, gold, and selenium. These results indicate that diverse metal-reducing bacteria may not only play important roles in cycles of metals and carbon biogeochemistry in natural environments, but also be potentially useful for the synthesis of nm-sized materials and immobilization of redox-sensitive metals and radionuclides.

Acknowledgement: This study was financially supported by GAIA project and BK21 program of the Korean Government.