

Publication**ATR-FTIR spectroscopy study of the adhesion of *Shewanella putrefaciens* bacterial cells to the surface of hematite****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 1516488**Author(s)** Elzinga, Evert J; Huang, Jen-How; Chorover, Jon; Kretzschmar, Ruben**Author(s) at UniBasel** [Huang, Jen-How](#) ;**Year** 2012**Title** ATR-FTIR spectroscopy study of the adhesion of *Shewanella putrefaciens* bacterial cells to the surface of hematite**Journal** Environmental science & technology**Volume** 46**Number** 23**Pages / Article-Number** 12848-55

Attachment of live cells of *Shewanella putrefaciens* strain CN-32 to the surface of hematite (α -Fe₂O₃) was studied with in situ ATR-FTIR spectroscopy at variable pH (4.5-7.7) and contact times up to 24 h. The IR spectra indicate that phosphate based functional groups on the cell wall play an important role in mediating adhesion through formation of inner-sphere coordinative bonds to hematite surface sites. The inner-sphere attachment mode of microbial P groups varies with pH, involving either a change in protonation or in coordination to hematite surface sites as pH is modified. At all pH values, spectra collected during the early stages of adhesion show intense IR bands associated with reactive P-groups, suggestive of preferential coordination of P-moieties at the hematite surface. Spectra collected after longer sorption times show distinct frequencies from cell wall protein and carboxyl groups, indicating that bacterial adhesion occurring over longer time scales is to a lesser degree associated with preferential attachment of P-based bacterial functional groups to the hematite surface. The results of this study demonstrate that pH and reaction time influence cell-mineral interactions, implying that these parameters play an important role in determining cell mobility and biofilm formation in aqueous geochemical environments.

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