# Biological and Abiotic dissolution of different oriented pyrite surfaces

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The relevance of microbial mineral leaching processes has resulted in a large number of studies by which microbial leaching of a wide variety of minerals by pure and mixed cultures of Bacteria and Archaea were experimentally examined.
The project presented here aims to enhance our understanding of effects of microbially mediated pyrite dissolution and the influence parameters such as varied metabolism and crystallographic orientation of pyrite surfaces. Microbial etching experiments on pyrite surfaces of different orientation, including hexagonal {100}, octahedral {111}, pentagondodecahedral {210}, tristetrahedral {211} and trisoctahedral {221} of natural and synthetic pyrite single crystals were leached by two archaeal strains, *Metallosphaera sedula* and *Sulfolobus metallicus*, and abiotic by saturated iron(III)sulfate solution, during a time period of up to 28 days. The long-term goals of the study are to establish means that allow the controlled manipulation of pyrite and other metal sulfide surfaces.
Using a ferrozine assay in order to determine the concentration of iron ions in solution as result of leaching of pyrite, it was revealed that *Metallosphaera sedula* is the most active oxidant. Epifluorescence microscopy observations showed that cells of the both strains attach partly to the mineral surface whereas the rest remains planktonic in the medium. Indicating that both organisms acted through both, the ‘contact’ and ‘non-contact’ mechanism of the indirect bioleaching mechanisms for the dissolution of pyrite. Surface alteration forms structures depending on surface crystallography up to several 10 µm in size, while the shape of the structures varies with face orientation.