Fate of heavy metals after *in situ* bioprecipitation induced by sulfidogenesis: A study on stability of metal precipitates

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In situ bioprecipitation (ISBP) is an effective and economical method for removal of heavy metals such as Zn, Cd, Co. While the ISBP process has been proven, the stability of metal precipitates formed during ISBP is major concern. For three different sites, *in situ* precipitation by stimulating sulfate reducing bacteria was achieved at lab scale for different metals (site 1 and 2 : Zn, Cd; site 3 : Co, Ni). The stability of the formed metal precipitates was studied by a variety of methods both after inducing ISBP in batch tests and in column experiments. Two wet chemical analyses, i.e., sequential extraction and aquifer analyses by redox treatment under three different atmospheres were applied. Scanning electron microscopy- Energy dispersive X-ray (SEM-EDX) and bioavailability under aerobic conditions (BIOMET) was also studied. For site 1 and site 2, glycerol and lactate-N/P and for site 3 cheese whey or lactate-N/P resulted in efficient metal removal and also formed most stable precipitates. The BIOMET tests indicated that the immobilized Zn was not bioavailable in most conditions. SEM/EDX performed on the pink precipitates formed on the aquifer in the lactate-N/P condition of site 3 showed that the main elements of the precipitates were Co and S.

Seismic properties of the Siberian craton mantle from Udachnaya xenoliths

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Mantle xenoliths brought up to the surface by the Udachnaya kimberlite provide a unique opportunity to study the effects of textural, mineralogical and geochemical variations on seismic properties of the central Siberian cratonic mantle. We studied thirteen xenoliths unusually fresh of lherzolite, harzburgite and dunite that represent depths ranging from about 50 to 180 km. Lherzolites are porphyroclastic and harzburgites display both porphyroclastic and coarsed-grained microstructures. Dunites are largely affected by recrystallization processes. Textural analysis is based on the Crystallographic Preferred Orientation (CPO) measurements of minerals using the EBSD technique. The first results show higher fabric strength ($J > 5$) for olivine in porphyroclatic peridotites and the lowest fabric strength ($J = 3.5$) is calculated for olivine in dunites. Olivine CPO patterns in porphyroclastic peridotites mainly display high concentration of [010]-axes perpendicular to the foliation and [100]-axes close to the lineation ([010]-fiber CPO) whereas the highest concentrations are the [100]-axes parallel to the lineation in dunites. These contrasted fabric patterns generate different seismic properties. In addition, we investigate the effects of high degree partial melting and large-scale interaction of melts with host mantle rocks that affected the lithospheric mantle as for example, a global Fe-enrichment of minerals. The seismic properties are calculated taking into account CPO measurements, anisotropic single crystal elastic properties, forsterite content in olivine and modal variations, and then compared with seismic observations below the Siberian craton.