



## **Sulphidation of the oceanic lithosphere: an experimental approach**

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Newly formed oceanic lithosphere close to spreading centers can be influenced by fluids that feed hydrothermal vents. These fluids often carry high amounts of dissolved gases such as H<sub>2</sub>S, which can trigger precipitation of sulphide minerals in the interacting rock during percolation. This process occurs equally in exposed mantle rock, serpentinised mantle rock, troctolite or gabbro and basalt, the lithology depending on the spreading rate at the ridge where hydrothermal activity is present. These later-stage fluid-rock interactions can develop different types of sulphide mineralization in the lithosphere.

In order to better understand these sulphidation reactions, we have conducted several batch experiments that placed different oceanic lithologies in contact with an H<sub>2</sub>S saturated, iron-free solution. The mixture was heated to 250°C at 400 bars and kept under these conditions for 2-8 weeks. In situ fluid and gas sampling was used to monitor reaction progress.

REM-analysis of the solid products has shown the growth of euhedral pyrite and magnetite crystals as well as dissolution textures in feldspar and olivine. The presence of pyrite (gabbro experiment) and magnetite (troctolite and serpentinite) is in agreement with the measured H<sub>2</sub>- and H<sub>2</sub>S-content in the analysed fluids. These Fe-bearing minerals grew although no iron was added to the fluid, showing the replacive nature of the reaction.

Geochemical modeling can be used to extend the application of these observations to different PT-conditions. Using this technique, we can start tackling the problem of replacive sulphide formation within hydrothermal discharge zones in oceanic basement of variable composition.