

Hydrogen generation mechanism on the magnetite surface with hydrothermal reaction

*Tomoya Tamura¹, Ryo Sugaya¹, Atsushi Kyono¹

1. Graduate School of Life and Environmental Sciences, University of Tsukuba

To elucidate the hydrogen generation mechanism on the magnetite surface during serpentinization, the observations of surface and chemical states of hydrothermally reacted magnetite were conducted by the electron microscope techniques. Hydrogen was detected with methyleneblue colorimetry. The SEM observations showed that the (100) plane was readily dissolved with the hydrothermal reaction. The electron diffraction patterns indicated that the shallow depth of the (100) plane was transformed to maghemite. The TEM analysis revealed that the precipitates on the (111) plane were composed of hematite and goethite. It is assumed that these precipitates were grown from the dissolved iron ion from (100) plane. Consequently, the hydrogen generation occurs with reduction of the H₂O.

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