

Precipitation Of Heavy Metals In Seawater Mediated By A Mn-Oxidizing Microbe Collected At The Seikan Undersea Tunnel, Japan

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The construction of the Seikan Undersea Tunnel under the Tsugaru Straits between Hanshu and Hokkaido islands of Japan was completed in 1985. In recent years, a red-slime composed of a microbial mat and a black slime of manganite deposited in the pilot shaft of the tunnel at about 150 to 250 meters below the seabed. The microbe strongly oxidize divalent manganese ion in seawater and precipitate manganite in analogy with *Gallionella* which is a well-known Fe- and Mn-oxidizing microbe (Mizukami et al., 1999). By using the microbe collected at the Seikan Undersea Tunnel, we experimentally investigated the possibility of precipitation of heavy metals in sea water mediated by microorganisms.

An aliquot of artificial seawater containing heavy metals (Ni, Co, Cd , etc.) with Mn(II) and a small amount of the red slime was incubated at 25°C, and the changes in concentration of the metals in solution were measured by atomic absorption spectrophotometry. The experiments showed that some kind of metals, such as Ni, rapidly coprecipitate with MnO₂ of buserite (10-angstrom manganite) structure. These results suggest that oceanic microorganisms may play an important role in the deposition of heavy metals on the sea-floor.

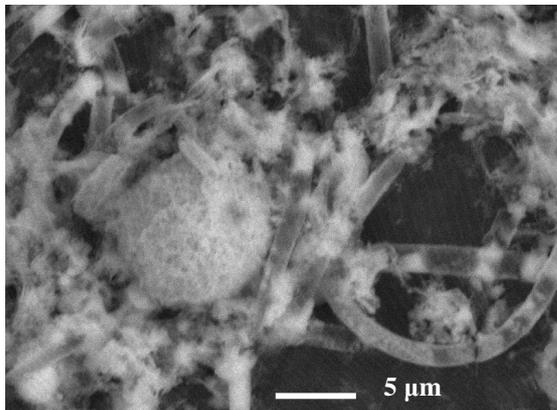


Fig.: Sheaths of the Mn-oxidizing microbe with manganite precipitate collected at the Seikan Undersea Tunnel. (LV-SEM picture)

References

- [1] Mizukami M., Mita M., Usui A. and Ohmori S. (1999) Resource Geology Special Issue, No. 20, 65-74.