

## On-site exposure experiment for synthetic manganese minerals

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Marine ferromanganese oxide deposits are most sensitive elements in surface aquatic environments, and accumulate various elements from the ocean water. We attempt to understand how and what control the variability in composition of a typical long-term growing ferromanganese oxide deposits, Fe-Mn crusts which accumulates several minor and trace elements with temporal and areal variation. As shown, in the proposed model (Usui et al., 2017) in which oxides remain stable as suspended matter even within OMZs and scavenge characteristic elements according to chemical and mineralogical form in the ocean waters. The unique key to solving the problem is the simple experiments of exposure of various-type plates and membrane-filtered synthetic oxide compounds at about 1000m water depth. We successfully recovered the man-made plates and synthetic buserite crystal-suspended bottle after maximum 15-year exposure. Thus we report here the morphological and compositional changes of the buserite crystals, which shows the mechanism of preferential accumulation of selected metals and mineral effects.

Keywords: ferromanganese crust, manganese nodule, one-site experiment, scarce metal