Geochemistry and origin of Fe-Mn sediment (umber) in the Mineoka Ophiolite

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Major, Trace and rare earth element concentrations are reported for umber from the Mineoka Ophiolite. Geochemical characteristics of umber are as follows; (1) umber exhibits a remarkable enrichment of Fe, Mn, P, V, Co, Ni, Cu, Zn, Y, Mo and REEs compared to Post Archean Australian Shale (PAAS), (2) these elements/iron ratios of umber are very similar to those of modern hydrothermal metalliferous sediments at mid-ocean ridge (MOR), (3) PAAS-normalized REE patterns of umber are characterized by a conspicuous negative Ce anomaly. These geochemical features suggest that umber were deposited near MOR.