Microscopic structure and related geochemistry of Fe-Mn crusts from Canary Seamounts (Central East Atlantic).

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Microscopic and submicroscopic structures have been analized in thin polished sections of Fe-Mn crusts from Canary Island Seamount Province (Central East Atlantic Ocean). The goal of this study was to find a correlation between different microstructure and geochemistry of oxy-hydroxides. Microanalysis have been performed by electron probe micro analyzer that has allowed to recognize 3 different main structures: dendritic, columnar sub-parallel and laminar massive. Every main microstructure shows different geochemistry depending on the different mineralogy of intergrown oxy-hydroxides.

Dendritic structures, formed by branched columns, have highest average contents of Fe (19 wt%) and minor Mn (14 wt%). Growth rates calculated based on the Co Chronomether were ranging from 2 to 20 mm/Ma. Columnar structures usually exhibit uniform sub-parallel grown and show similar average content for Mn and Fe (16 wt%). Massive-laminated structures have high contents of Mn (18 wt%) and minor Fe (15 wt%). Growth rates calculated for these two structures were 1.7 and 2.2 mm/Ma respectively.

Co, V, Ce, P and Ca concentrations are important. Co, Ce and Ca are highest in massive and columnar structures and their contents increase with the increase of Mn, showing a positive correlation. The columnar structure shows the highest contents in strategic elements. P and V have a clear positive correlation with Fe and they show highest contents in dendritic structure.

We interpret the different microstructures as result of paleoenvironmental conditions during the crusts formation. Intergrowth of Fe-Mn oxyhydroxides, authigenic phosphates and eolian detrital inputs should be responsibles for mode of accretion, textural features and growth rates in crusts.