

Hydrothermal input in Fe-Mn crusts from Canary Islands Seamount Province: LA-ICP-MS analyses and Fe Isotopes.

MARINO, E.^{1,2,3}, GONZÁLEZ, F.J.¹, LUNAR, R.^{2,3},
SOMOZA, L.¹, MEDIALDEA, T.¹, KUHN, T.⁴,
WEGORZEWSKI, A.⁴, OESER, M.⁵

¹Geological Survey of Spain (IGME). Madrid, Spain

*Correspondence: emarino@ucm.es

²Dpt. Mineralogy and Petrography (UCM). Madrid

³Geosciences Institute (IGEO-UCM-CSIC). Madrid

⁴Federal Institute for Geosciences and Natural Resources
(BGR). Hannover

⁵Leibniz Universität Hannover Institut für Mineralogie.
Hannover

Fe-Mn crusts from the Canary Islands Seamount Province have been found at water depths between 300 and 4000 m on slopes and tops of several seamounts. Hydrothermal and volcanic input in crusts formation have been previously discussed by authors on the basis of their mineralogy and the regional studies [1].

Four samples have been selected as representative of different genetic types: hydrogenetic, mixed hydrogenetic-diagenetic and hydrogenetic-hydrothermal based on previous studies. The crusts are essentially formed by Mn-oxides represented by vernadite (δ -MnO₂), and less birnessite, asbolane and buserite. Fe-oxyhydroxides are represented essentially by amorphous goethite. LA-ICP-MS analyses of the samples revealed the presence of several Fe-rich laminae both in the contact with the substrate rock and within the Fe-Mn oxyhydroxides layers. These laminae have Fe up to 35 wt. % and show slightly high Cu (900 μ g/g) and As (1200 μ g/g) concentrations and low contents of Mn (<4 wt. %) and Co, Ni, Mo and REY (in average Σ 2600 μ g/g).

On these samples LA-ICP-MS Fe isotopes analyses have also been obtained. Results report that hydrogenetic laminae show $\delta^{57}\text{Fe}$ values between -1.74 and -0.64 ‰. Fe-rich laminations within the layers have $\delta^{57}\text{Fe}$ values quite similar to the hydrogenetic laminae showing a slightly positive tendency of the $\delta^{57}\text{Fe}$ (-0.52 to -0.25‰). In contrast Fe-rich laminae in contact with the substrate rock and Fe oxides from the last eruption of El Hierro Island show positive $\delta^{57}\text{Fe}$ values ranging from 0.27 to 0.60‰ respectively. Newly formed minerals within the rock (goethite and hematite) have high positive $\delta^{57}\text{Fe}$ values ranging from 0.72 to 2.02‰ are therefore in the range of the hydrothemally formed Fe-oxides.

[1] Marino et al. (2017). Ore Geol. Rev. 87, 41-61.