

Quantitative analysis of scandium in lateritic nickel ores using LA-ICP-MS

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Scandium (Sc) is included in rare earth elements in the broad sense, its however geochemical behavior during magmatic differentiation and weathering is different from yttrium and lanthanides. Scandium is produced from a variety of deposits as by-product and little attention has been paid to dominant Sc-bearing minerals of each deposit. We present results of microanalysis of nickel ores from the Soroako deposit using LA-ICP-MS in order to identify the most dominant Sc-bearing minerals. Because crater diameter of the LA-ICP-MS is $\sim 10 \mu\text{m}$, quantification of fine-grained minerals in the order of micron to submicron were difficult. We performed quantitative analyses of single mineral-grains and also mineral aggregates to determine elemental composition of each end-member.

According to LA-ICP-MS analysis, Sc content of goethite range mainly from 80 ppm to 300 ppm, whereas SiO_2 and spinel are very low in Sc (< 10 ppm). These results are consistent with a negative correlation between whole-rock Sc and Ni contents in the Soroako deposit, because goethite is poor in typical Ni-rich ores (saprolite). This study result indicates that goethite is the most dominant Sc-bearing mineral in Soroako.

Keywords: scandium, nickel, laterite, limonite, ore deposit, goethite