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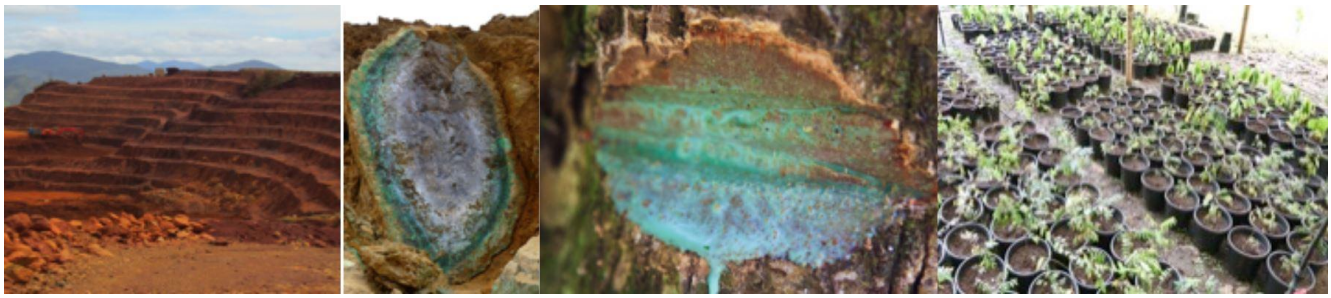

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Nickel concentrations resulting from the weathering of ultrabasic rocks may lead to the formation of saprolitic ore where the garnierite may occur. This latter is mainly found in veins and fissures within the saprolite and can host 20 to 40 wt% Ni (Soler et al., 2008). Garnierite is characterized by a mixture of various nickel-bearing magnesium-phyllosilicates, such as serpentine, talc or sepiolite, which form a series of solid solution by Mg-Ni substitution (Gleeson et al., 2004).

In the context of the SOLSA project (www.solsa-mining.eu), which aims to develop an on-mine-on-line expert system for industrial applications by combining sonic drilling, chemical, mineralogical characterizations and data treatment, the analysis of nickel-rich phases (e.g. garnierite, smectite, serpentine) has been studied in view of their interests for nickel exploration in lateritic profiles.

Thus, in order to define characteristic signals of garnierite, a set of samples representative of the diversity of Ni-bearing clay minerals has been characterized using different analytical techniques, such as X-ray diffraction (XRD), Raman microspectroscopy, scanning electron microscopy (SEM) and electron probe micro-analysis (EPMA). The collected samples are Ni-bearing laterites from New Caledonia and the Dominican Republic. The results obtained show the effect of Ni on the position of certain X-ray diffraction peaks and/or Raman bands. The observed shifts between Ni-poor and Ni-rich phyllosilicate phases are characteristic of the substitution of Mg by Ni in octahedral sites and can be correlated to the amount of Ni (Cathelineau et al., 2015; Baron and Petit, 2016).

References:

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