



Geochemical and mineralogical survey of critical elements (PGE, REE, Sc and Co) in Ni laterites from the Caribbean

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Laterites developed above ultramafic protoliths are indispensable ore deposits for the supply of Ni on a global scale. In addition, Ni laterites can also host other valuable metals such as platinum-group elements (PGE), rare earth elements (REE), Sc and Co that are currently all defined as critical for western industries because of high supply risks (EC 2018). Whereas Co is occasionally mined as a co-product during Ni production from laterites, other critical elements are usually not recovered. In most cases this can be explained by in general low grades ranging from below a few hundred ppb (PGE) to a few hundred ppm (REE and Sc). On the other hand, there also exist Ni laterites with more significant potential for PGE, REE and Sc co-production, but little is still known about their deportment and (changing) mineralogy throughout the lateritic profile. However, such knowledge is considered essential for successful exploration and subsequent ore processing strategies. In the case of PGE for example, recent laboratory and field studies have demonstrated that e.g. Pt is mobile and bioavailable under certain surface conditions leading to bio-neoformation of Pt nanoclusters in the presence of microorganisms (e.g. Reith et al. 2016). Our research group investigates Ni laterites for their potential as future unconventional critical elements ore deposits since almost a decade. During this survey, innovative hydrosorption technique for heavy-mineral concentration has been applied that led to the discovery of target minerals that helped to better understand the complex geochemistry and mineralogy of Ni laterites. This contribution aims to provide a summary of geochemical and mineralogical data collected from different Ni laterite profiles from the Caribbean with focus on the deportment of PGE, REE, Sc and Co in a lateritic environment.

EC (2018) Report on critical raw materials and the circular economy. <https://publications.europa.eu/en/publication-detail/-/publication/d1be1b43-e18f-11e8-b690-01aa75ed71a1/language-en/format-PDF/source-80004733>. Accessed on the 07/01/2019.

Reith, F., Zammit, C.M., Shar, S.S., Etschmann, B., Bottrill, R., Southam, G., Ta, C., Kilburn, M., Oberthür, T.; Ball, A.S., Brugger, J. (2016) Biological role in the transformation of platinum-group-mineral grains. *Nat Geosci*, 9, 294–298.