PGE and PGM in the breccias and magnetites in the Nuasahi Massif, Singhbhum Craton, India

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PGE oxides in breccias and magnetites

Platinum-group element (PGE) mineralisation in the breccias in the Nuasahi ultramafic-mafic complex is well known [1]. Samples of breccia collected from the Baula mine on traverse 3 [2] analysed by LA-ICPMS show that the PGE are dominantly in platinum-group minerals (PGM) rather than in base metal sulphides (BMS) and include PGE-oxides. In addition a completely unknown enrichment in PGE has been located in a layer of magnetites in the upper part of the complex. A diverse PGM assemblage in the magnetites shown below includes predominantly Pd-Sb, it's oxide, and sperrylite ($PtAs_2$) with Pt-Pd oxides, Pd-Pb, Pd-Cu-oxide, rare laurite (RuS_2), hollingworthite (RhAsS) and Pd-Sb-Te.

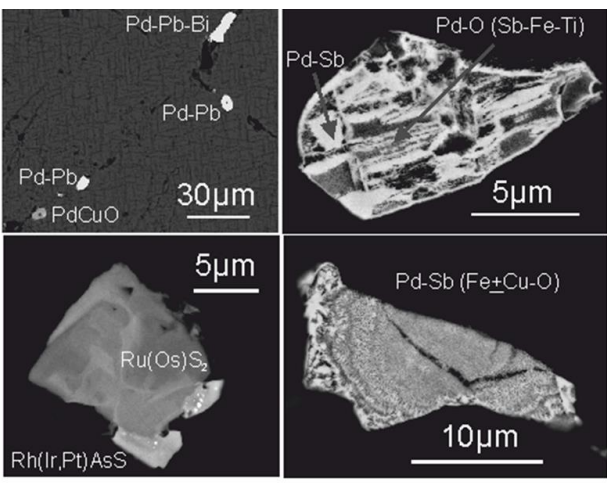

Figure 1: Examples of PGM from the magnetite.

Discussion

The PGM in the breccias may have formed early in the presence of semi-metals such as arsenic prior to the crystallisation of the BMS. The PGM in the breccias and magnetites are likely to be of magmatic origin and have been modified subsequently to form oxides during weathering in this hot and wet climate. The origin of similar PGE-oxides that have been described from elsewhere are also attributed to weathering, for example [3].

[1] Khatun *et al*. (2014) *Lithos* **205**, 322-340. [2] Mondal & Zhou (2010) *Min. Dep*. **45**, 69-91. [3]Suárez *et al*. (2010) *Min. Dep*. **45**, 331-350.