Geochemistry and PGE potential of Bangur Gabbro from the Baula-Nuasahi Mafic Ultramafic Complex, Orissa (India)

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Geological set-up

The Baula-Nausahi mafic ultramafic complex comprises of (1) Gabbro-Anorthosite unit, (2) Peridotite unit (with three chromite bands Ganga, Lakshmi and Sankar), (3) Pyroxenite unit and (4) Bangur Gabbro (~3.1 Ga) (Auge *et al.* 2003).

Geochemistry

The Zr/TiO_2*0.0001 vs Nb/Y diagram shows these gabbros in the field of basalt. SiO2, Na_2O and Al_2O_3 shows negative trend while MnO and Fe_2O_3 show positive trend with Mgo which indicates the differentiation trend of magma and is reflected in mineralogy. Trace element pattern of Bangur gabbro shows the positive Rb and Y anomaly and negative Nb anomaly. The positive anomaly of Rb and Y can be attributed to the development of secondary amphiboles due to alteration. The REE pattern suggests that these gabbros were derived from slightly enriched source.

The metal ratio diagram shows the PGE potential of Bangur Gabbro as almost all the samples plots in the field of Layered complex. So the samples plotted above the extrusive rocks field also show enough potential as the chrome-spinel in Bangur gabbro may have affected the ratio.

Discussion and Conclusion

The hydrothermal processes have lead to the formation of secondary minerals as well as remobilization of Base metal sulphide. The metal ratio diagram shows the potential for PGE and supports the further investigation to delineate the mineralized zone within Bangur gabbro.

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The Alteration Mineralogy and Mass Change of Volcanics from Zigana (Gümüşhane, NE-Turkey)

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The Late Cretaceous volcanic rocks around Zigana Mountain (Gümüşhane) at the eastern part of Black Sea Region (NE-Turkey) belong to the east Black Sea metallogenic province, and have intensive hydrothermal alteration although weathering alteration is limited. The basement of the study area is formed by the Late Cretaceous basalt, andesite and their pyroclastics. These rocks are overlied by the Late Cretaceous aged dacitic rocks, namely Dacite-I and Dacite-II described by [1] and [2]. These volcanic rocks are bimodal in character and have tholeitic to calc-alkaline affinity, and have developed in volcanic arc environment. The Late Cretaceous rocks are the host of VMS and vein type deposits in the study area and region.

Volcanic rocks in the study area have been altered to the sericite/illite–chlorite facieses, and contain sericite/illite, chlorite, quartz, carbonate minerals (ankerite and calcite), iron-oxide, and rare kaolinite, smectite and epidote as the alteration products. Sericitization/illitization is the most common type of the hydrothermal alteration associated with the Zigana Volcanics, and chloritization is the second. Pyritisation is seen all volcanics, and the most commonly in dacites. In some fields, limonitisation is occasionally present. Epidotization is rare, and especially seen at basalt and andesite. Isocon method was applied to estimate the mass gains and losses of the Zigana Volcanics as a result of hydrothermal alteration. According to this, basalt and andesite, Dacite-I, and Dacite-II have 2-61 % mass gain, 71 % mass gain and 42 % mass loss, and 44 % mass gain and 32 % mass loss, respectively. Namely, both mass gain and mass loss have occurred in volcanics during the hydrothermal alteration of the parent materials. Illitization-chloritization-kaolinitization increase generally from least altered rock to highly altered rock, whereas carbonatization decreases. The relation between metals such as Cu, Pb, Zn and sericitization/illitization, chloritization and silisification shows that fluids which cause sericitization and chloritization did not increase the amount of these metals and, in fact, it can be said that this fluids are poor in these metals. This also shows that they developed under different hydrothermal conditions.

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