

## **POLYMETALLIC DEPOSITS OF THE BOULA-NUASAH I GNEOUS COMPLEX, ORISSA, INDIA**

S. Khaoash, J. K. Mohanty and A. K. Paul

The Boula-Nuasahi Igneous complex, a 3km long pluton trending NNW-SSE, is intruded into Precambrian Iron Ore Group metasediments. It forms the western extension of Nilgiri-Nuasahi belt on the southern fringe of Singhbhum-Orissa craton. This complex consists of ultramafic (dunite, peridotite, pyroxenite and serpentinite), mafic (gabbro, gabbroic anorthosite, anorthosite) and felsic (granophyre) rock types. The ultramafic rocks contain four chromite lodes. The chromites are generally hard and massive with variable  $\text{Cr}_2\text{O}_3$  content (55% at lowermost Durga lode to 32% at uppermost Ganga lode). The physical and chemical characters make them good refractory grade material. The mafic rocks host Ti-V-magnetite. These ores contain significant amount of  $\text{TiO}_2$  (14% avg.) besides  $\text{FeO} + \text{Fe}_2\text{O}_3$  (avg. 80%). Titanium can be extracted/ recovered from Ti-rich slag produced from this ore by plasma smelting. Besides utility of this ore is enhanced with production of Fe-Ti-C composite. At the contact of ultramafic/mafic, there exists a more or less continuous bouldery zone known as Breccia zone which hosts sulphides, PGMs and Au occurrences. Various Fe-Cu-Ni sulfides are present in this zone. This Breccia zone contains Pt + Pd from 1 - 10 ppm and Au 70 ppb to 3 ppm. The Pt + Pd and Au occurrence is strongly matrix dependent. The values are highest in sulfide predominated assemblage. The ore deposits are co-genetic with the host rocks and are formed at different stages of the complex development. However the origin of PGM and breccia zone is not yet clear and requires more detail geological and geochemical study.