

## Petrography and Mineral Chemistry of Ultramafic Rocks of Sukinda Complex, Singhbhum Craton, India

H. S. Kale\* and G. G. Wadpalliwar

*Department of Geology, RTM Nagpur University, RBD Laxminarayan Campus,  
Law College Square, Nagpur- 440 001, India  
\*E-mail: mahakal46@gmail.com*

### Abstract

The present paper evaluates the mineral chemistry of olivine, chromite, montmorillonite, orthopyroxene and illmenite within the ultramafic rocks of Sukinda mafic-ultramafic complex of southern Singhbhum craton. The minerals chrysotile, antogorite, montmorillonite, olivine, chromite, magnetite, hematite, goethite and quartz were separated from serpentinised peridotite. Orthopyroxene separated from orthopyroxenite. This rock also contains minor olivine, chromite, illmenite, tremolite, chlorite, antigorite, chrysotile and pleonaste *etc.* Chromitite contains 99% chromite with minor silicate and sulphide minerals. To understand the mineral chemistry of ultramafic rocks, electron probe micro analyses (EPMA) of olivine, chromite, orthopyroxenite and illmenite was carried out. Geochemical composition of olivine and chromite from serpentinised peridotite, orthopyroxene from orthopyroxenite and chromite from chromitite show modest variation.

In serpentinised peridotite, chromite is characterised by low Mg# (5.23 - 42.93) ( $Mg\# = 100 \times Mg / (Mg + Fe^{2+})$ ) and high Cr# (83.82 - 89.59) ( $Cr\# = 100 \times Cr / (Cr + Al)$ ), along with significant enrichment of Al (4.86 - 7.15) and Fe (9.56 - 18.29). Majority of olivine grains from serpentinised peridotite are characterised by high Mg# (83.66 - 98.37), low CaO (0.01 - 0.15) and high MgO (31.44 - 44.04) contents, while FeO (0.49 - 7.38) content show wide range. These olivines are enriched in  $Cr_2O_3$  (0.02 - 1.16) as compared to the  $Cr_2O_3$  (0.01 - 1.00) content of orthopyroxene from orthopyroxenite.

Orthopyroxenite from Sukinda massif are Mg-rich enstatite. Its En content varies from 89.1 to 91.89%, which makes up more than 95% of the volume. These results are also consistent with the refractory character. The CaO content of enstatite ranges from 0.02 to 0.77% and it is characterised by high Mg# (83.30 - 98.37). The orthopyroxene from serpentinised peridotite have high content of MgO (30.90 - 39.13), low contents of CaO (0.02 - 0.77) and  $Al_2O_3$  (0.19 - 0.91), while FeO (0.49 - 5.43) content show wide range. The low content of Ca and Al and the assemblage is typical of boninitic melt.

**Keywords:** Mineral chemistry, Olivine, Chromite, Sukinda mafic-ultramafic complex, Singhbhum craton, India