OXIDIZED Ru-Fe-Os-Ir COMPOUNDS IN THE MUGLA CHROMITITE (S-W TURKEY)

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The first discovery of minute grains (< 15 μm) of oxidized compounds of Ru-Fe-Os-Ir was reported from weathered chromitites of the Vourinos ophiolite complex (Greece) by Garuti and Zaccarini (1997). Subsequently, these minerals were found in chromitites of Urals (Russia) and Loma Peguera (Dominican Republic) invariably associated with a alteration assemblages (Zaccarini et al., 2004, Proenza et al., 2007). A first description of their optical properties and micro-hardness was given by Garuti et al., (1997), suggesting that the minerals might represent a new mineral species of PGE-oxides, although it was not possible to support this conclusion with structural data. The presence of oxygen in the compounds was ascertained by in-situ electron microprobe analysis, although results were affected by spurious fluorescence from direct or secondary excitation of the adjacent phases, due to the small size of grains and.

In this paper we describe a further occurrence of oxidized compounds from chromitites of the Mugla ophiolite complex (S-W Turkey). Several grains, varying 20-60 μm in size, were encountered in heavy concentrates obtained by hydro-separation technique (Rudashevsky et al., 2002). The electron microprobe analysis of these grains, not affected by spurious fluorescence from their including matrix, confirms the presence of oxygen as major component of the PGM. The grains systematically contain Si and Mg up to 9.1 and 10.4 at%, respectively. The Si and Mg correlate each other (r = + 0.96) but do not correlate with any other component including oxygen. This evidence support the observation (figure 1) that the oxidized minerals contain sub-microscopic inclusions of chlorite or serpentine (Garuti et al., 1997). Therefore part of the analyzed oxygen may come from excitation of these silicate inclusions. If the weight percent of Ru, Fe and Os, are recalculated as ideal oxides with a constant valence of +4 for the PGE and +3 for Fe, the analyses totals are close to 100 wt%. All grains have PGE > Fe, their compositions in terms of Ru-Os-Ir overlap the field of coexisting laurite, supporting the conclusion that the oxidized compounds derived from desulfuration of laurite at low temperature, with substitution of the removed S by Fe and O (Garuti and Zaccarini, 1997, Zaccarini et al., 2004). In contrast with the Vourinos occurrence where the oxides formed under weathering conditions (Garuti and Zaccarini, 1997), the Ru-Fe-Os-Ir oxides of Mugla occur in paragenetic assemblages (ferrian chromite, serpentine, chlorite) compatible with serpentinization under hydrothermal conditions as it happened for the chromitites of the Urals (Garuti et al., 1997).

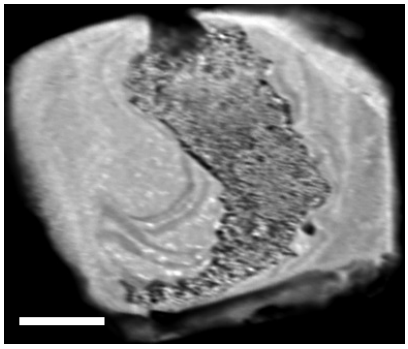

Figure 1: Scale bar 10 μm.

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