

## A FURTHER OCCURRENCE OF RUTHENIRIDOSMINE

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### INTRODUCTION

In a paper dealing with nomenclature of natural phases in the ternary osmium-iridium-ruthenium alloy system, Harris & Cabri (1973) defined rutheniridosmine as a new Os-Ir-Ru mineral group having Os less than 80 atomic per cent of (Os+Ir+Ru), and Ru 10 to 80 atomic per cent of (Os+Ir+Ru), no single element being more abundant than 10 atomic per cent of the total metals. Rutheniridosmine is hexagonal; its crystallographic and chemical relationships to other Os-Ir-Ru alloys are best seen in Figure 4 of Harris & Cabri (1973). These authors analyzed rutheniridosmine from Canada, South America, Papua and New Guinea. The present note records a Russian occurrence of this new mineral, an example of a very ruthenium-rich alloy in the series.

The rutheniridosmine-bearing sample has collection number 15182 in the California Division of Mines Mineralogy Collection; it is a noble-metal placer paysand labelled "Demidoff Estate, Central Urals". Grains are angular and equant, ranging in size from a few microns to 1.5 mm in diameter. Although individual particles are homogeneous, grain-to-grain Ru content ranges from 10 to 50 weight per cent, with corresponding variation in (Os+Ir). The fragment analyzed was roughly ellipsoidal and 180 microns in length. Electron probe analysis, using pure elements and alloys as standards, and applying all instrumental and matrix-effect corrections to the data, gave Ru 47.9, Os 29.2, Ir 15.0,

Pd 4.0, Rh 2.3, Au 0.4 and Pt 2.5 weight per cent, summation 101.3. The formula on the basis of two metal atoms per unit cell is  $Ru_{1.21}Os_{0.38}Ir_{0.26}Pd_{0.10}Rh_{0.06}Pt_{0.03}Au_{0.01}$ . Optical properties are in qualitative agreement with the data given by Harris & Cabri (1973) and Stumpfl & Tarkian (1973). X-ray powder data show the mineral is isomorphous with pure osmium and ruthenium metals, the cell edge values ( $a$  2.713  $\pm$  0.001,  $c$  4.301  $\pm$  0.002) and  $d$ -spacings being somewhat more comparable to pure ruthenium.

This mineral contains appreciably more Ru than the rutheniridosmines cited by Harris & Cabri (1973), and more of this element than the alloy occurrences analyzed by Stumpfl & Tarkian (1973). It would thus seem to be the most ruthenium-rich alloy so far described. At the same time it contains sufficient osmium as to approach very closely indeed the composition of osmian ruthenium, another new mineral group defined by Harris & Cabri (1973).

### REFERENCES

- HARRIS, D. C. & CABRI, L. J. (1973): The nomenclature of the natural alloys of osmium, iridium and ruthenium based on new compositional data of alloys from world-wide occurrences. *Can. Mineral.* 12, 104-112.
- STUMPFL, E. F. & TARKIAN, M. (1973): Natural osmium-iridium alloys and iron-bearing platinum: new electron probe and optical data. *N. Jb. Mineral. Mh.* 7-8, 313-322.

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