**Structural variations in the londonite-rhodizite solid solution**

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Londonite and rhodizite are rare minerals belonging to the borate class, which mainly contain beryllium, aluminium, as well as large alkaline cations. These large cations are potassium and caesium, which can substitute to each other to form a complete solid solution between the two end-members: londonite, CsBe4Al4(B11Be)O28, and rhodizite, KBe4Al4(B11Be)O28.

The samples of londonite and rhodizite, investigated herein, were collected in the lithium caesium-tantalum (LTC) (1) granitic pegmatites of Fiakarandava and Antandrokomby, Madagascar (2). The crystals occur as rhombododecahedra, sometimes showing small faces of the cube or of the tetrahedron. They can reach 3 cm in diameter, and show various colours: yellow, pink, brown, orange, milky white, grey, black, green and colourless.

The samples were investigated by single-crystal X-ray diffraction techniques (Rigaku Xcalibur diffractometer, EOS detector, MoKα radiation) and by X-ray fluorescence spectroscopy (Thermo Fischer Niton XL3t spectrometer, GOLDD detector). Structure refinements were performed in space group *P*-43*m*, to final R1 values between 2.64 and 6.64%. Unit-cell parameters show significant variations: *a* = 7.291-7.326 Å, and V = 387.91-393.13 Å3 (with *Z*=1). The structure of the londonite-rhodizite series is composed of five types of cations distributed over four different crystallographic sites. Aluminium is located at the centre of weakly distorted octahedral sites, whereas Be and B are each surrounded by four oxygen atoms forming tetrahedral coordination polyhedra. The alkaline cations (Cs, K) are located at the origin of the unit cell, and are coordinated by 12 oxygen forming a unusual coordination polyhedron which can be described as a large tetrahedron with each of its summit truncated (3).

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