

## OLD MISTAKES IN DETERMINATION OF MINERAL COMPOSITION

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Some cases of mistakes in determination of minerals content are described.

9 references.

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History of mineralogy shows numerous cases of essential change of mineral chemical formulae. It is related to their subsequent additional studies, structural or chemical ones, using more sophisticated methods.

Earlier, at the epoch of domination of "wet" chemistry, mistakes in determination of content of related isomorphous ions were rather usual. Thus, in lamprophyllite ("molengraphite") of Pilansberg (RSA) and belovite from the Lovozero massif strontium was considered as calcium (Minerals..., 1937; Semenov, 1981). Division of titanium and zirconium was erroneous in lorenzenite from Greenland, which proved to be a complete analogue of ramsayite from the Khibiny massif.

Similar mistake was made on analysis of Ceylon and Brazil zirkelite, which proved to be analogues of zirconolite from the Kola Peninsula (isovalent isomorphism Zr-Ti and Sr-Ca) (Semenov, 1981, 1991). Commercial elements of the Lovozero massif loparite – niobium and tantalum – at first were taken as titanium (heterovalent isomorphism TiCa-NbNa) (Kuznetsov, 1926).

Tantalum in columbite (USA) at first was considered as part of isovalent niobium. Many false rare-earth "minerals" and "elements" were distinguished in 18<sup>th</sup> and 19<sup>th</sup> centuries during separation of complex isomorphous mixture of 14 lanthanoids and yttrium. Rare earths were sometimes taken as aluminium (ashcroftine from Greenland) and often as isomorphous thorium: thorotungstite proved to be yttritungstite not containing thorium (Bredshaw, 1950).

Yet in recent times a great problem was separation of amphoteric elements beryllium and aluminium. Thus, beryllsilicates bavenite (Kutukova, 1946) and roggianite (Passaglia, 1969, Rassaglia, Vezzaline, 1989), equivalent to ginzburgite (Voloshin, 1986), were described as alumosilicates. So called "loss on ignition" included sometimes, besides water, also carbon dioxide (initially not discovered in tundrite).

Sometimes chemical analyses of minerals were carried out without previous complete qualitative spectral (energy-dispersed and

other) analyses. Thus, in nordite from the Lovozero massif during long time zinc (about 10%) was not reported (Semenov, 1981). Electron microprobe analysis at first attempts of study of enriched in sodium phosphate of rare earths vitusite yielded low content of Na (evaporated at strong heating) in it. It is usually far from 100% the sum for microprobe analyses of minerals of weathering crust of carbonatites (pyrochlore, monazite, ilmenorutile) due to their nano-sizes (and water adsorption). "Lost" rare elements cadmium, gallium, indium were firstly extracted from sphalerite, and thallium and selenium – from pyrite.

Besides mistakes in mineralogy are known cases of direct adulteration. Thus, as new mineral – texasite – was suggested chemical preparation – oxisulphate of praseodymium (Crook, 1980).

### References

- Bredshaw N.* Thorotungstite – a misnomer // *Colon. Geol. and Min. Resources.* **1950.** 1. N. 1.
- Kutukova E.I.* Bavenite from Izumrudnye kop'i // *DAN of the USSR Academy of Sciences.* **1946.** 54. № 8 (in Russian).
- Kuznetsov I.G.* Loparite, new rare earth mineral of the Khibiny tundra // *Izv. Geolkom.* **1926.** 44. № 6 (in Russian).
- Minerals of the Khibiny and Lovozero tundra / Under revision of academician A.E. Fersman. M.-L.: The USSR Academy of Sciences. **1937.** 563 p. (in Russian).
- Passaglia E.* Roggianite, a new silicate mineral // *Clay minerals.* **1969.** V. 8. N. 1.
- Passaglia E., Vezzaline G.* Roggianite – revised chemical formula and zeolitic properties // *Min. Mag.* **1989.** V. 52. N. 365.
- Semenov E.I.* Mineral Tables. M.: Nedra. **1981.** 397 p. (in Russian).
- Semenov E.I.* Mineral Systematics. M.: Nedra. **1991.** 333 p. (in Russian).
- Voloshin A.V.* Ginzburgite – new calcium-beryllium silicate from desilicated pegmatites // *Mineralogical Journal.* **1986.** № 4. P. 85–90 (in Russian).