Pollucite - an old, new mineral to Norway

Roy Kristiansen[1] and Hans Christian Olsen[2]

[1]Postboks 32, N-1650 Sellebakk, Norway (mykosof@online.no)
[2]Skustadgt. 9, N-1395 Hvalstad, Norway

Introduction

Pollucite, $(Cs,Na)_2(Al_2Si_4O_{12})\cdot 2H_2O$, is the caesium analogue of analcime, and the first and only caesium mineral found in Norway. The mineral was collected in the Ågskardet lithium pegmatite, Meløy, Nordland, by one of us (HCO) together with Per Chr. Sæbø in 1971, but never officially reported from the locality. The present paper gives general information about pollucite, a compilation on the Cs-content in Norwegian minerals and a brief description on pollucite from the Ågskardet pegmatite.

Pollucite

The type locality of pollucite is one of the LCT (Li-Cs-Ta) type pegmatites at Elba, and described by Breithaupt (1846). Pollucite is widely distributed in LCT pegmatites worldwide, not the least in Sweden (Teertstra *et al.* 1996) and Finland (Teertstra *et al.* 1993). The mineral is often associated with lithium minerals like spodumene, petalite and amblygonite-montebrasite.

Pollucite is cubic. Well developed crystals are rare, but well known from pegmatites in Afganistan and Pakistan. Usually the mineral has a rather inconspicuous appearance, being massive with irregular cleavage, vitreous lustre and turbid, white or colorless. Pollucite reminds of quartz (D = 2.65 g/cm^3), but with a higher density (D = 2.9 g/cm^3). There are about 20 different caesium minerals in the world, most of them found in only one or two localities. Pollucite, however, may occur in large massiv bodies up to several tons in weight, and is an important industrial source for caesium.

Cs content of Norwegian minerals

Caesium is a trace element in many minerals, especially micas. Oftedal (1942) analysed different types of micas for Cs, Rb and Li from the Høydalen pegmatite in Tørdal. They mostly contained <0.1 % Cs, but a light red muscovite contained 0.5 % Cs. Oftedal (1970) analysed Cs in Norwegian beryls and reported Cs in the range 0.05 - 0.5 % Cs. Juve & Bergstøl (1990) described a cesian bazzite from Heftetjern in Tørdal with 3 % Cs_2O, while Raade *et al.* (2004) analysed another sample of bazzite with more than 8 % Cs_2O. Raade & Kristiansen (2004) performed neutron activation analyses on approximately twenty different minerals from Heftetjern, Tørdal, primarily for Sc, but also including Cs and Rb. Most of the minerals contained less than 100 ppm Cs, while the dark micas contained 2000 - 4000 ppm Cs, and yellow and colorless beryls 1900 - 3400 ppm Cs. This does not quite conforms with the results of Rosing-Schow *et al.* (2018) as their results on micas from Høydalen, Skardsfjell and Heftetjern are in the range 100 to 1000 ppm Cs. Analyses on different micas from Evje-Iveland shows large variations, from 60 to 13 000 ppm Cs. Pinkish beryls from Høydalen in Tørdal and Ågskardet in Meløy contain approximately 1 % Cs_2O (pers. comm. Ivar Oftedal 1972). In the Larvik Plutonic

complex (LPC) eirikite contains up to 2 % Cs_2O (Larsen *et al.* 2010). Ihlen (2004) prospected for pollucite at Ågskardet and collected a large number of samples, which were tested by a chemical reaction method without finding indication of pollucite.

Pollucite from Ågskardet

Oftedal (1950) mentioned that it is unlikely that a mineral such as pollucite will be found in the Ågskardet pegmatite. However, a sample of pollucite was collected about 50 years ago from the locality. It is a massive, irregular piece (Fig. 1), about 6 x 8 cm in size, greyish white, turbid, but transparent in small fragments. There is no sign of alteration. It was originally identified by the late Per Chr. Sæbø. He probably identified the mineral by its optical properties, because there are no X-ray diffraction films in the archives at the Natural History Museum, University of Oslo. To confirm the true identity Alf Olav Larsen performed a SEM/EDS-analysis, which showed 1.7 wt.% Na_2O, 17.8 wt.% Al_2O_3, 42.3 wt.% SiO_2, and 37.1 wt.% Cs_2O, which harmonizes perfectly with chemical analyses of pollucites from both Sweden and Finland.

Fig. 1. *Pollucite (6 x 8 cm) from the Ågskardet pegmatite, Meløy, Nordland. Photo: A. Haugen.*

Acknowledgement

We are indebted to Alf Olav Larsen for verification of the pollucite from Ågskardet.

References

Breithaupt, J.F.A. (1846): Pollux. *Annalen der Physik und Chemie (Poggendorff's)* **69**, 439-439.

Ihlen, P. (2004): *Undersøkelser av Li-pegmatitter i Nord-Helgeland.* NGU Rapport 2004-061. 42 pp.

Juve, G. & Bergstøl, S. (1990): Caesian bazzite in granite pegmatite in Tørdal, Telemark, Norway. *Mineralogy and Petrology* **43**, 131-136.

Larsen, A.O., Kolitsch, U., Gault, R.A. & Giester, G. (2010): Eirikite, a new mineral species of the leifite group from the Langesundsfjord district, Norway. *European Journal of Mineralogy* **22**, 875-880.

Oftedal, I. (1942): Lepidolit- og tinnstenførende pegmatit i Tørdal, Telemark. *Norsk Geologisk Tidsskrift* **22**, 1-14.

Oftedal, I. (1950): En litiumførende granittpegmatitt i Nordland. *Norsk Geologisk Tidsskrift* **28**, 234-237.

Oftedal, I. (1970): Lithium contents of Norwegian beryls. *Norsk Geologisk Tidsskrift* **50**, 245-247.

Raade, G. & Kristiansen, R. (2003): Scandium as a trace element in the Heftetjern pegmatite minerals. *International Symposium on the Mineralogy and Geochemistry of Scandium, University of Oslo, Abstracts and Proceedings* **2**, 36-37.

Raade, G., Bernhard, F. & Ottolini, L. (2004): Replacement textures involving four scandium silicate minerals in the Heftetjern granitic pegmaite, Norway. *European Journal of Mineralogy* **16**, 945-950.

Teertstra, D.K., Černý, P., Langhof, J., Smeds, S.A. & Grensman, F. (1996): Pollucite in Sweden: occurrences, crystal chemistry, petrology and subsolidus history. *GFF* **118**, 141-149.

Teertstra, D.K., Lahti, S.L., Alviola, R. & Černý, P. (1993): Pollucite and its alteration in Finnish pegmatites. *Geological Survey of Finland, Bulletin* **368**, 1-39.