Contents

1 New finds from worldwide localities - March 2018

1.1 Rouaite from Cerro Minado Mines, Huercal-Overa, Almeria Spain

Samples host several 100 μm sized intense blue crystals in massive cuprite ore with malachite impregnations.

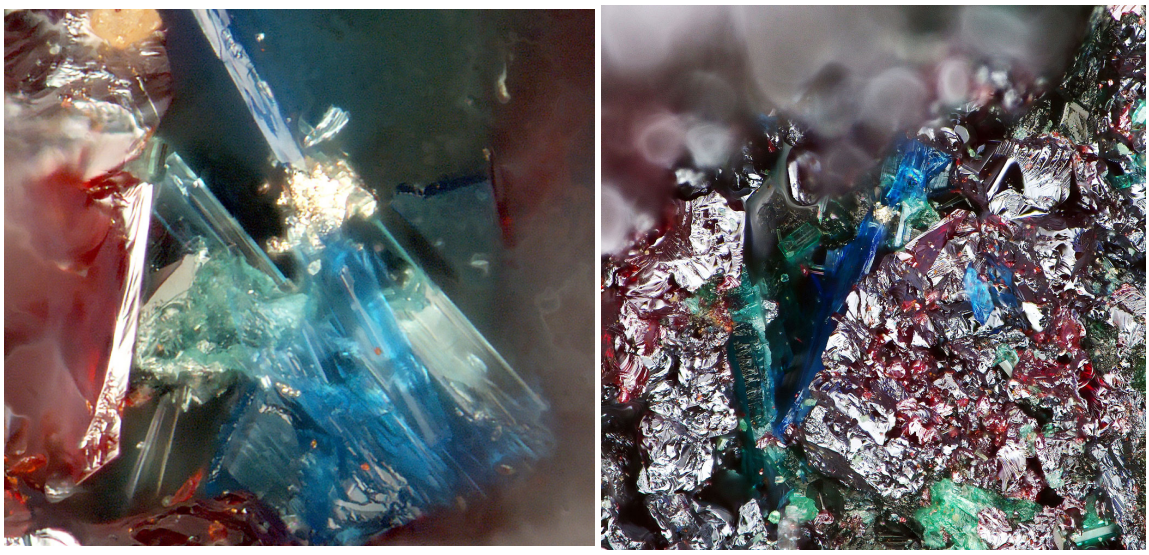

Figure 1: Light image of rouaite (blue), field of view approx 200 μm (left). Micro photograph of the bluish parts with surrounding cuprite and malachite , fov $\approx$ 800 μm (right).

Find was made by collector A. Lechner, Bavaria, Germany in the dumps of the Cerro Minado Mines, Cuesta Alta, Huercal-Overa, Almeria, Andalusia, Spain, and were identified as gerhardtite. The gerhardtite-rouaite phases are hard to distinguish by x-ray diffraction experiments. Samples were analysed using a 532 nm Raman spectrometer MA-RB-V01 (*stonemaster*©). Laser power of ≈ 50 mW was reduced by 0.6 ND filter and spectrum was collected over 20 s. Rruff database was used as reference.

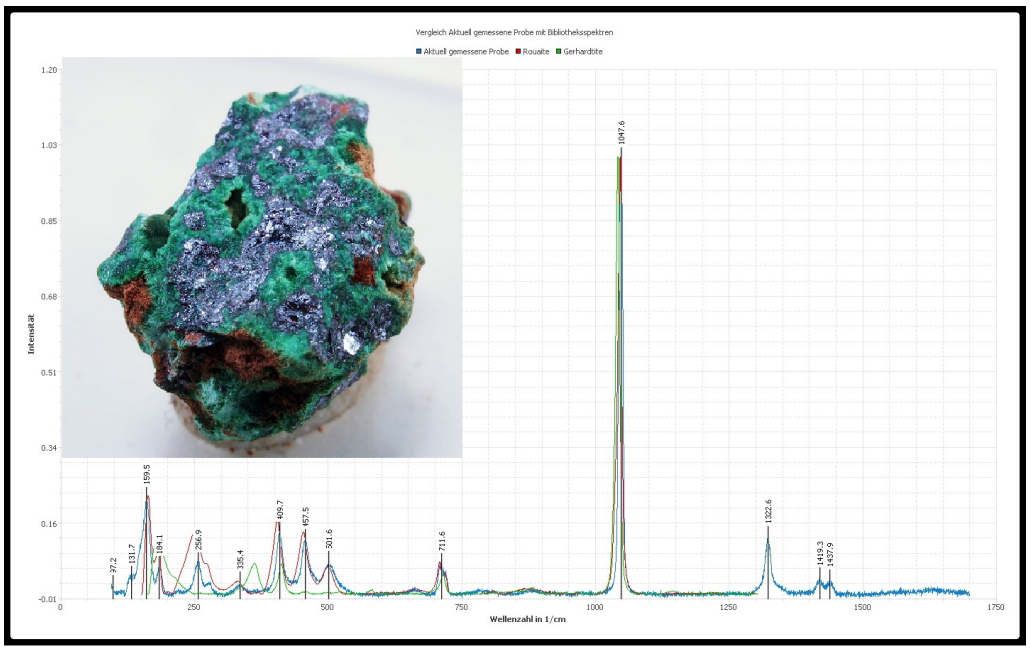

Figure 2: Raman spectra of measured sample, rouaite and gerhardtite. The best fit of the measured sample to reference is rouaite. Detail view of the complete specimen with a widt of ≈ 0.8 cm.

Major differences are visible in the low wave-number regime: Peaks at ≈ 502, 458 and 257 cm^{-1} fit well to rouaite and are (almost) absent for gerhardtite. A peak, only denoted for gerhardtite, at ≈ 360 cm^{-1} does not match with the measured sample. The typical NO_3^- peak around 1048 cm^{-1} fits well with rouaite and is slightly shifted to lower wave-numbers for the gerhardtite reference. The presence of both minerals is likely and further measurements of the greenish crystals will follow.

1.2 Ktenasite and Antlerite from the Eureka Mine, Castellestao, Catalonia, Spain

Ktenasite occurs in several 10 μm sized tabular crystals with sometimes flattened edges on uranium impregnated sandstones.

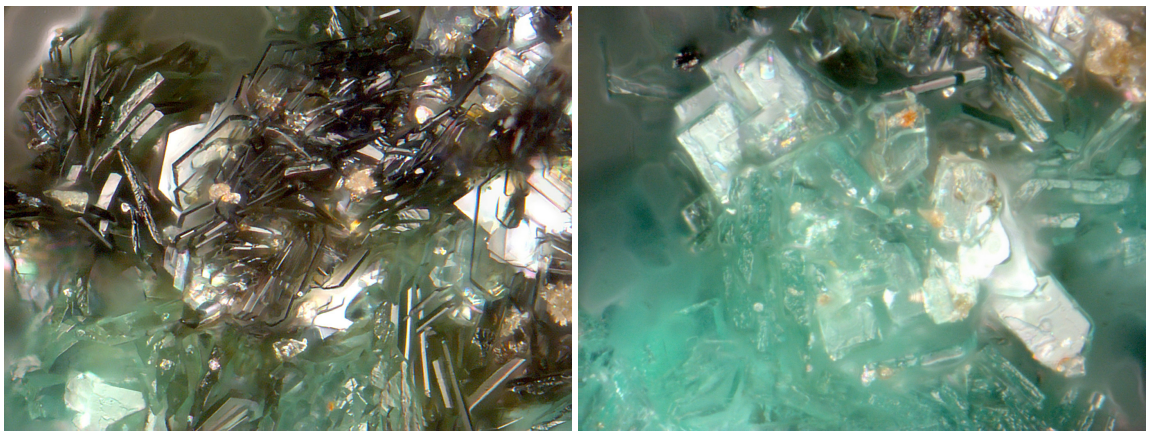

Figure 3: Light images of ktenasite, field of view approx 300 μm .

Sample was illuminated with 532 nm laser using 0.6 ND filter and Raman spectrum was collected over 15 s. The spectrum confirms presence of ktenasite along with the crystal habit.

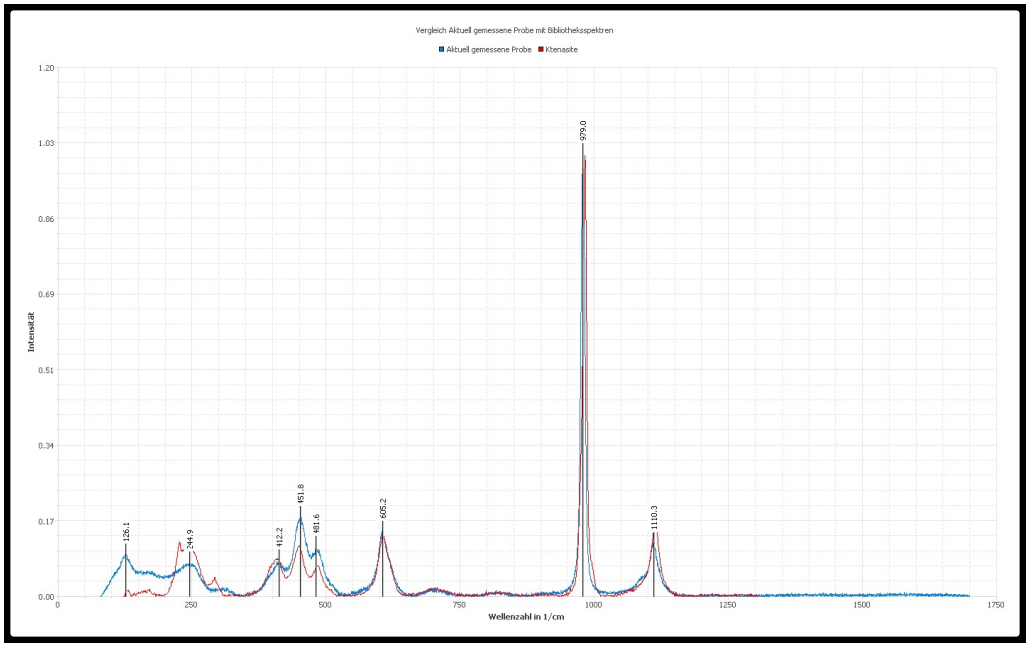

Figure 4: Raman spectra of measured sample and rruff reference of ktenasite. Crystal habit and Raman data confirms ktenasite at this locality.

Antlerite occurs on the same sample along with natrozippeite in greenish-blue microcrystals in μm forming aggregates.

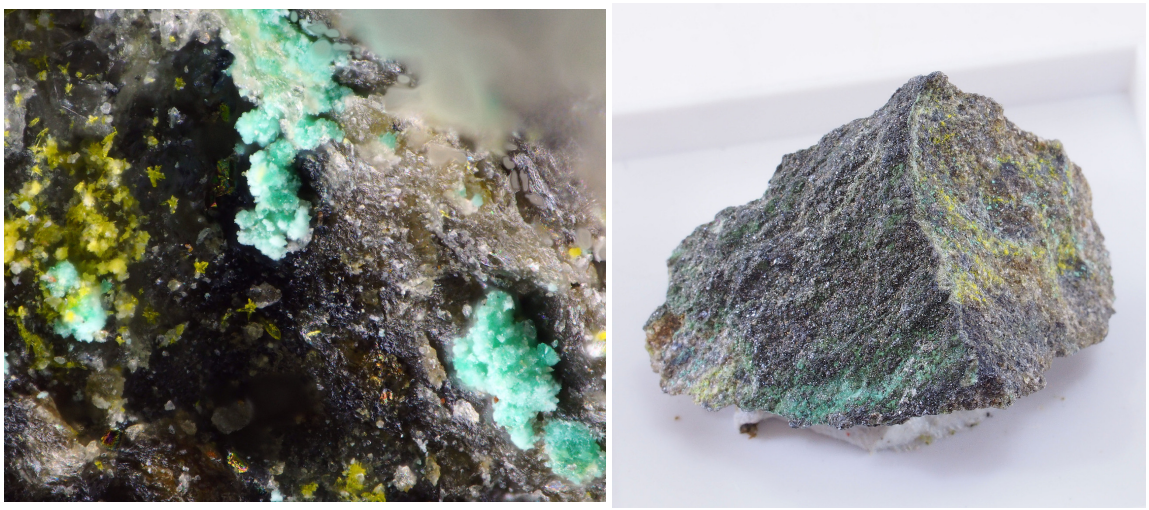

Figure 5: Light image of natrozippeite (SEM-EDS conf.) and antlerite (bluish-green), field of view approx 1.3 mm (left). Macro photograph with ktenasite on the left and natrozippeite/ktenasite on the right, sample width $\approx$ 2 cm.

Antlerite was confirmed by Raman spectroscopy using 532 nm laser at 0.6 ND integrating over 12 s.

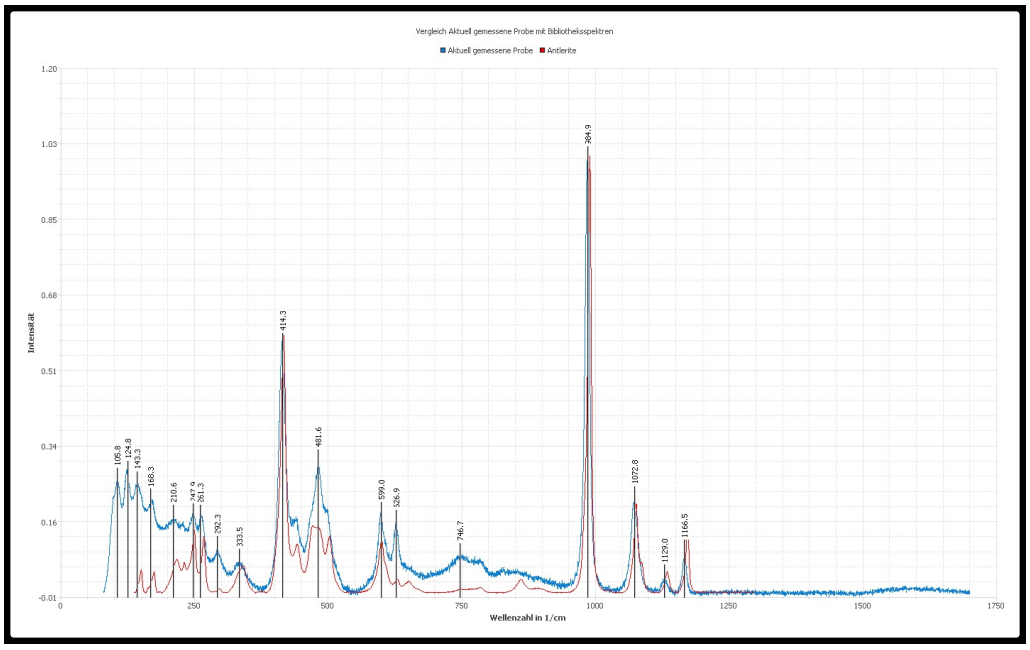

Figure 6: Raman spectra of measured sample and rruff reference of antlerite. Raman data confirms antlerite at this locality.

1.3 Huemulite from the Eureka Mine, Castell-Estao, Catalonia, Spain

This rare mineral occurs in mm-sized orange impregnations of U-V impregnated sandstone matrix among metamunirite (Raman conf.) and another yet not assignable mineral.

Figure 7: Detail image of huemulite (SEM-EDS/Raman conf.), field of view approx 2.4 mm (left). Macro photograph of the complete sample with metamunirite (Raman conf.), sample width ≈ 3.5 cm.

Mineral was confirmed by Raman spectroscopy using 532 nm laser with 0.6 ND filter integrating over 12 s. Standardless SEM-EDS analysis on grains gave the following results in atomic percent: Na: 17, Mg: 3, V: 76, while oxygen was not quantified. Raman analysis matched well with the structure of triclinic hummerite ($K_2Mg_2(V_{10}O_{28})$ $\cdot 16H_2O$). While chemical composition from previously obtained EDS data was possibly fitting with the triclinc huemulite $Na_4Mg(V_{10}O_{28}) \cdot 24H2O$, but only Raman reference for the structurally related hummerite was available, we concluded that this mineral is huemulite.

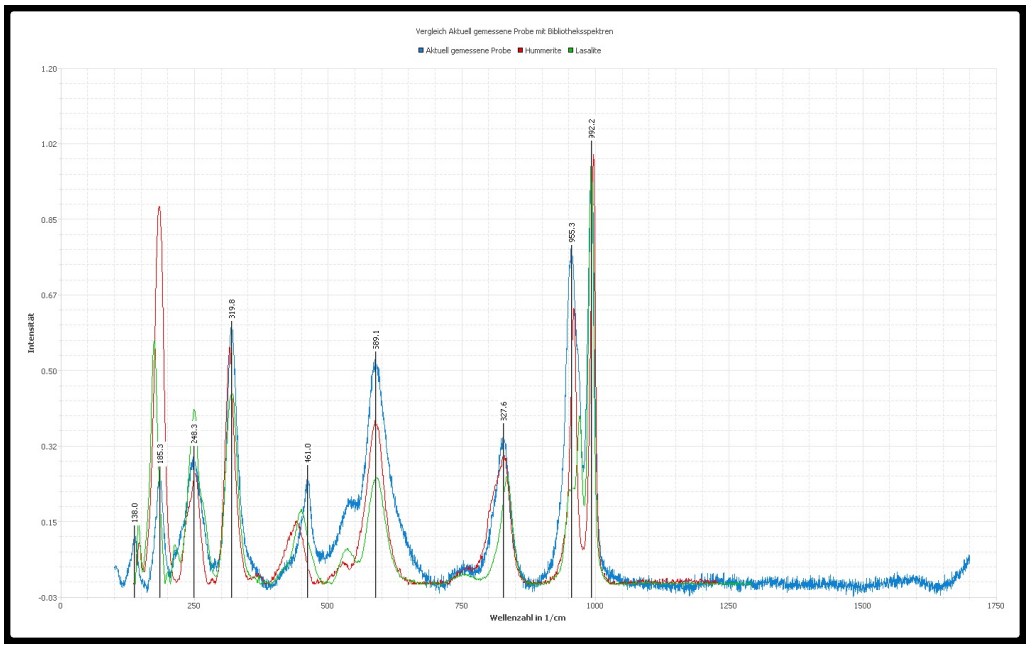

Figure 8: Raman spectra of measured sample and rruff reference of lasalite and hummerite. Lasalite does not match well. Along with SEM-EDS results the mineral was identified as huemulite.

1.4 Hoganite from the Bou Nahas Mine, Er Rachidia Province, Meknès-Tafilalet Region, Morocco

From a Spanish collector, we got samples with an unknown greenish-blue mineral in mm-sized crystals on native copper from the Bou Nahas Mine, Er Rachidia Province, Meknès-Tafilalet Region, Morocco.

Figure 9: Light image of hoganite (blue), field of view approx 1.2 mm (left). Macro photograph hoganite covering coppering, hand for scale.

Samples were initially SEM-EDS analysed and only copper was found as main constituent.

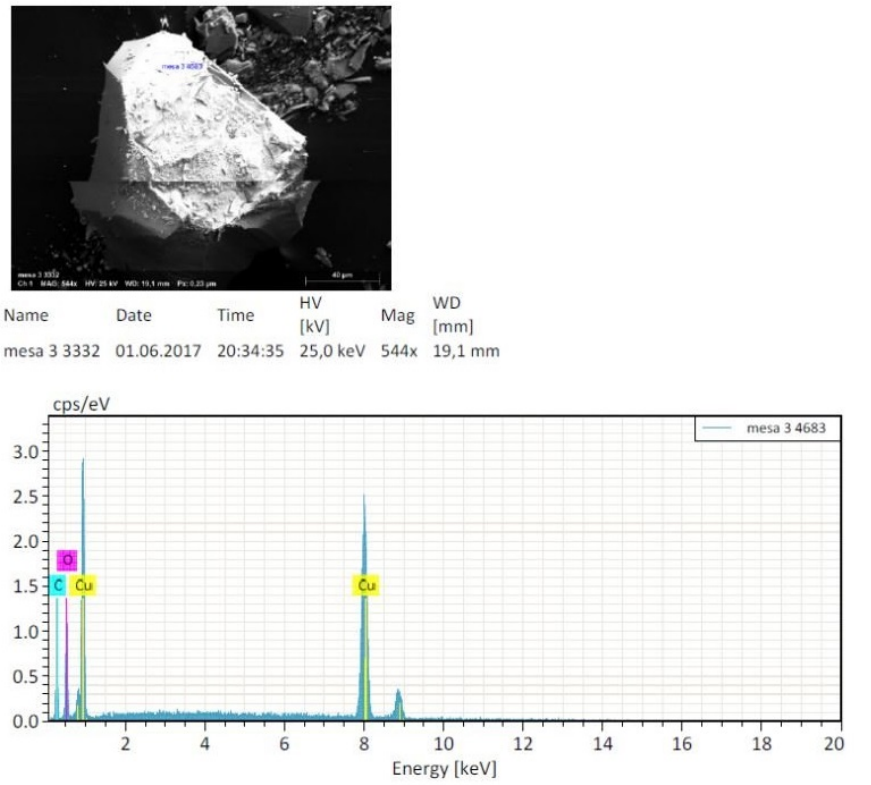

Figure 10: EDS spectrum of a hoganite crystal (uncoated) with massive charging in high vacuum sem chamber. Cu is the main constituent, C was not quantified.

Later samples were analysed with P-XRD and data could be matched with hoganite well.

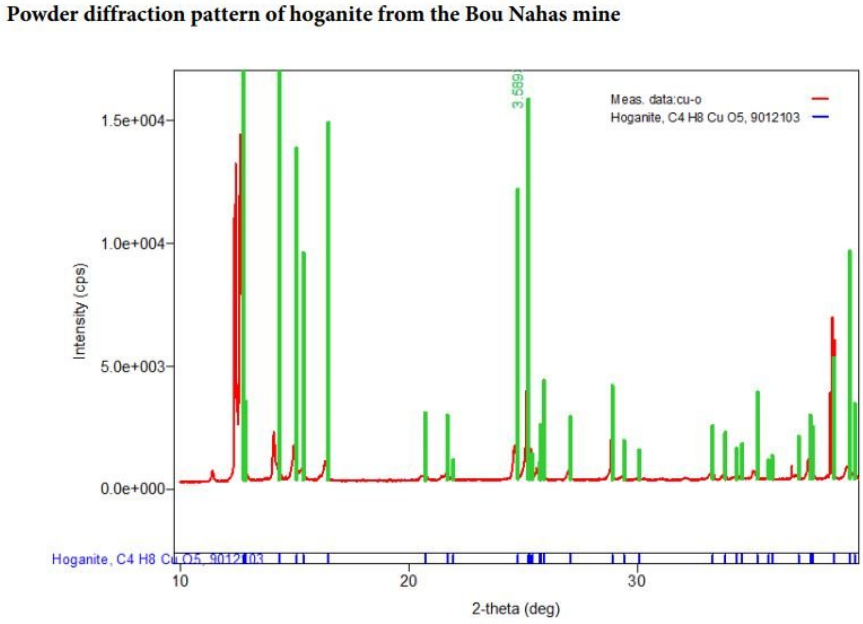

Figure 11: XRD pattern of powdered hoganite crystals matches with the sample. Data was collected with a Rigaku Miniflex 600 x-ray diffractometer.

Raman measurements were also carried out, but not many reference data is published to date. Data matched well.

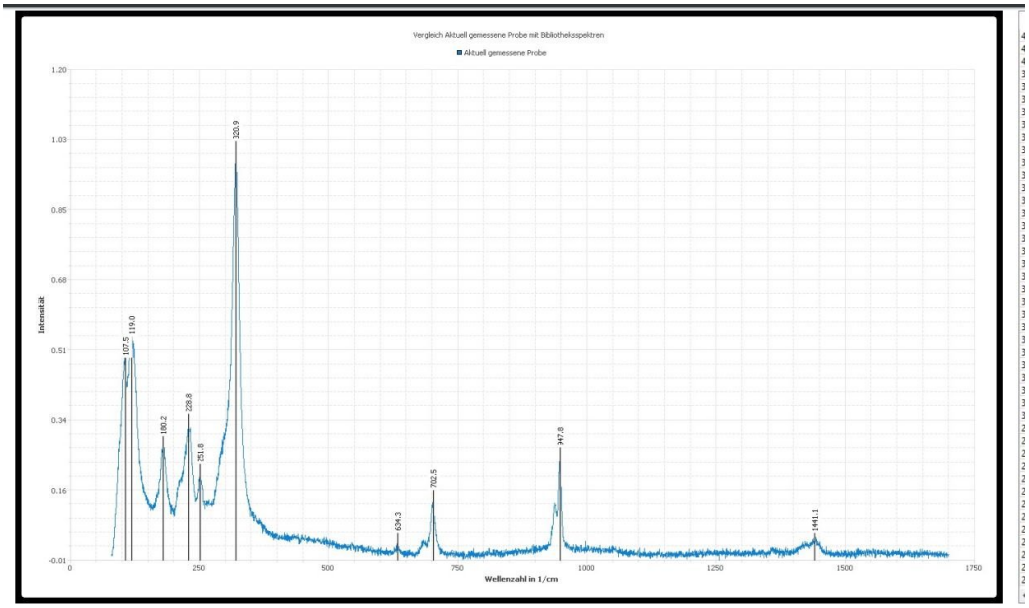

Figure 12: Raman spectrum of hoganite.

As the formation of this mineral requires acetic acid, which is not ubiquitous in nature, and also the synthesis is easy (adding hydrogen peroxide and acetic acid to native copper [1]), questions rose that this mineral can not have formed naturally [1]. Up to now there is no proof to answer this question for a 100% safety. The confirmation of fresh malachite close and partly under hoganite does not yet rule out a synthetic formation process. *Remarks from author: Dashkovaite, the salt of formic acid, was recently found on a galena specimen from Tsumeb, suggesting a cleaning process of this specimen with formic acid in the past. This example illustrates the dynamic formation of crystals in even short periods when chemical environment changes!*

1.5 Sal ammoniac, 2.7 km from the workings at Coronel Manuel Rodriguez Mine, Chile

These samples were initially offered as krohnkite with blodite. Previous analysis was made at the University of Atacama, but no information was published.

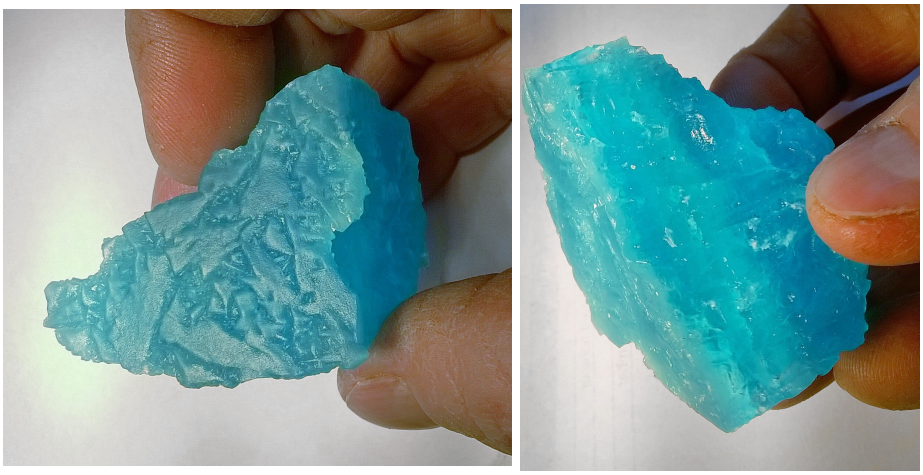

Figure 13: Macro photographs of sal ammoniac with strange patterns (hand for scale) .

According to a Chilean seller, these samples were collected 2.7 km from the Coronel Manuel Rodriguez Mine, Chile. Some samples show a flat polished-like pattern with strange look and color zonation parallel to that, suggesting a growth direction perpendicular to this pattern.

Figure 14: The krohnkite Locality Near Coronel Manuel Rodriguez Mine, photo R. Rojas. See also: [2]

Although the locality shows a rich pit, see picture 14, only a small amount of spec-

imens could be collected due to weathering process on the surface. Not only the presence of dead animals inside the crystal aggregates, but also the uncommon high concentration of NH_4^+ in the region of Mejillones remains doubtful [3]. A possible explanation for this unusual geological setting, could be postmining or anthropogenic formation, as described on the blog of the selling platform e-rocks.com [2]. Then, these minerals would not count as a natural occurence and should not be listed in the localities database. Chemical analysis performed by G. Möhn [3] confirmed the presence of NH_4^+, Cl^- and minor Cu^{2+}, SO_4^{2-}, while presence of Na^+, Mg^{2+}, CO_3^{2-} was negative. Sal ammoniac with minor contents of copper sulfate, responsible for the blue colour, was concluded. The later performed XRD confirmed the presence of sal ammoniac without any doubts.

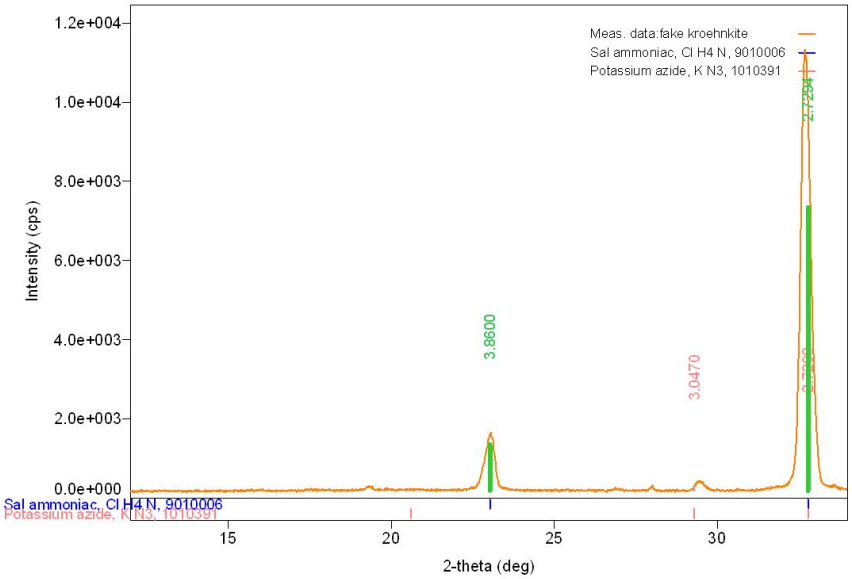

Figure 15: XRD pattern of sal ammoniac matching well with the pattern of a sample previously sold as krohnkite, from the pit 2.7 km from the Coronel Manuel Rodriguez Mine, Chile.

To fully rule out a synthetic product, future collectors have to visit this locality (if exists) and collect samples.

2 Rediscoveries of minerals from worldwide localities

2.1 Semseyite and meneghinite from the Apollo Mine, Raubach, Westerwald, Rhineland-Palatinate, Germany

Semseyite appears as grey metallic crystals with a dull luster up to few mm accompanied by often orientated grown grey metallic, striated meneghinite up to 2 mm. Both minerals are found in pyrite veins embedded in siderite.

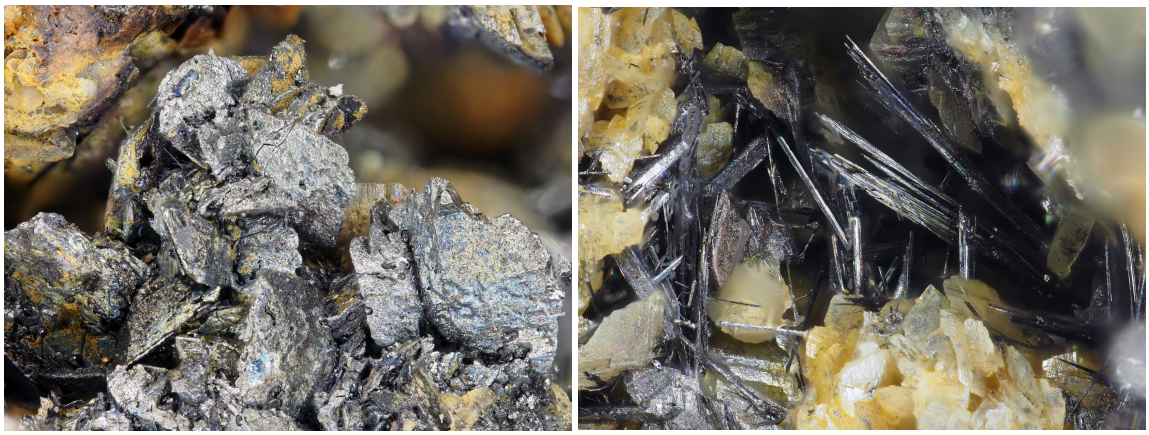

Figure 16: Micro photographs xrd confirmed semseyite, fov ≈ 4 mm on siderite and xrd conf. meneghinite forming striated needles on semseyite/siderite, fov ≈ 1.7 mm.

Figure 17: Hand sized sample with massive semseyite and semseyite in crystals embedded in a pyrite vein of siderite matrix.

These two minerals were first reported from the Apollo mine by [4] in the year 2000, along with plagionite. No information about finds by collectors was made to my knowledge in the past. Semseyite and meneghinite were both confirmed by P-XRD method and matched well with reference data.

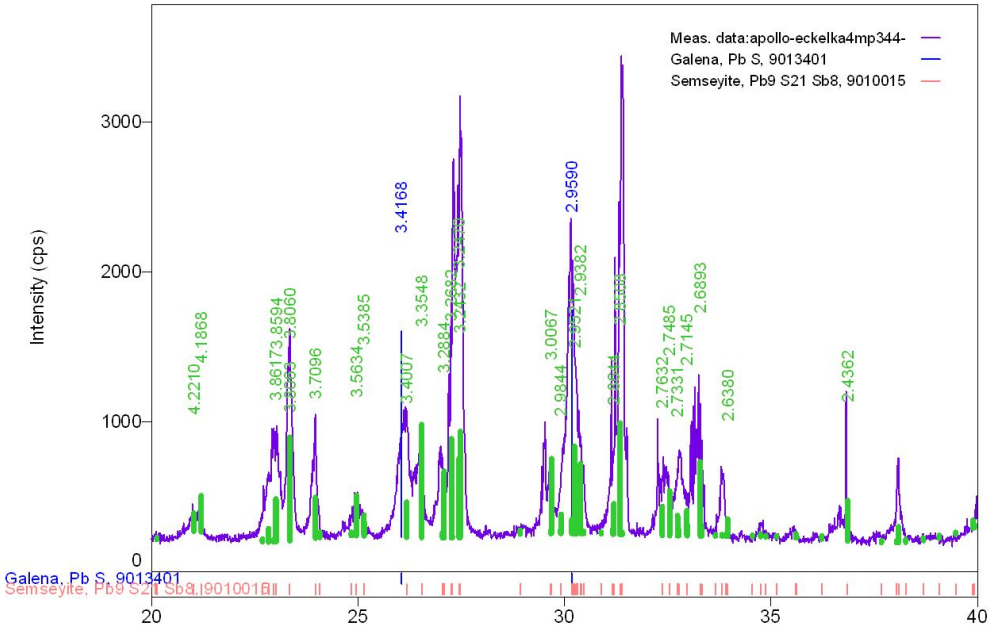

Figure 18: XRD pattern of semseyite from the Apollo mine, Raubach and reference.

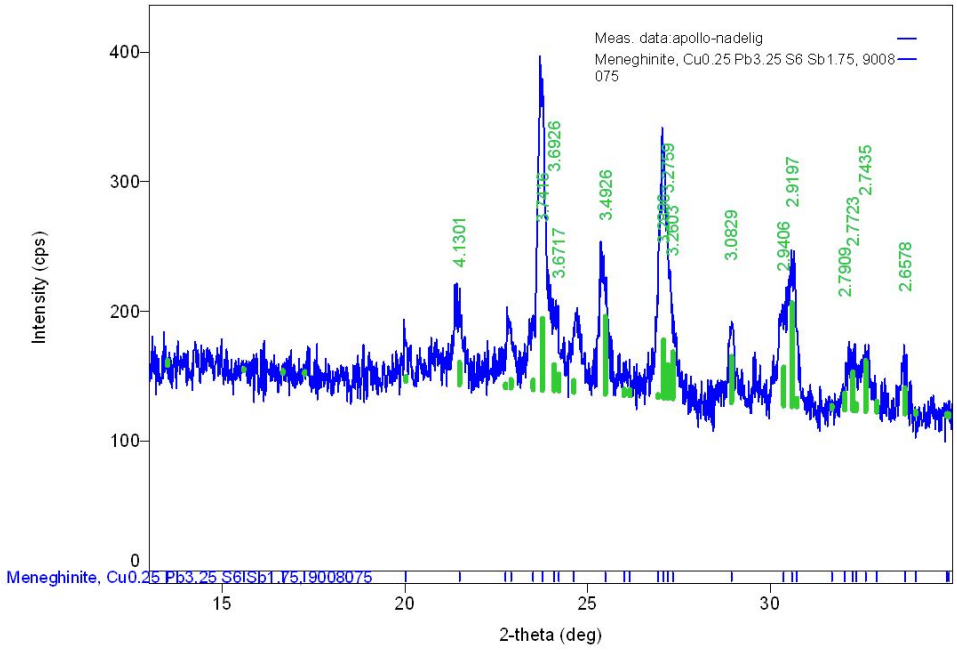

Figure 19: XRD pattern of meneghinite from the Apollo mine, Raubach and reference.

Peak list

No.	2-theta(deg)	d(ang.)	Height(cps)	FWHM(deg)	Int. I(cps deg)	Int. W(deg)	Asym. factor
31	21.46(5)	4.137(9)	35(5)	0.48(8)	33(2)	0.96(18)	1.9(11)
32	22.81(2)	3.896(4)	28(4)	0.30(6)	15(2)	0.54(15)	0.60(19)
33	23.696(13)	3.752(2)	171(10)	0.215(18)	66.9(18)	0.39(3)	0.60(19)
34	24.691(12)	3.6027(18)	34(4)	0.24(4)	11.4(11)	0.33(8)	1.1(6)
35	25.411(7)	3.5023(9)	67(6)	0.23(2)	22.0(14)	0.33(5)	1.1(6)
36	27.073(4)	3.2910(5)	124(9)	0.305(15)	52.2(16)	0.42(4)	1.1(3)
37	28.910(9)	3.0858(10)	52(6)	0.11(3)	9.9(9)	0.19(4)	1.1(8)
38	30.644(6)	2.9151(6)	70(6)	0.44(2)	36.4(18)	0.52(7)	5(2)
39	32.37(6)	2.763(5)	25(4)	0.70(5)	18.9(16)	0.75(18)	0.9(3)
40	33.622(19)	2.6634(15)	27(4)	0.21(3)	6.0(6)	0.22(6)	0.9(3)

Figure 20: d-values of meneghinite from the Apollo mine, Raubach.

The reported presence of plagionite [4], could not be reconfirmed by us until now. This is a unique find made by A. Eckelkamp of a Pb-Sb-sulfosalts mineral assemblage, which produced outstanding samples of this mineral for Germany.

References

[1] S. Sachdev. *A new find: Hoganite from Morocco.* URL `http://www.mineral-forum.com/message-board/viewtopic.php?p=61199#61199`. [Online; accessed on 8.03.2018].

[2] e-rocks Ltd. *Chilean Blues - Update on the find at Coronel Manuel Rodriguez Mine.* URL `https://e-rocks.com/blogs/1/chilean-blues-update-find-coronel-manuel-rodriguez-mine`. [online; accessed on 8.03.2018].

[3] G. Möhn. *Talks with G. Möhn about the find 2.7 km from Coronel Manuel Rodriguez, Chile.* 2018.

[4] T. Wagner and N. J. Cook. *Mineralium Deposita*, 35:206–222, 2000.