CARLHINTZEITE FROM DACHANG, QINGLONG CO., QIANXI'NAN (GUIZHOU, CHINA) AND HAGENDORF (BAVARIA, GERMANY)

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BACKGROUND

Carlhintzeite is a hydrated calcium aluminum fluoride described as a new mineral species by Dunn et al. (1979) based on specimens from the Hagendorf pegmatite (Bavaria, Germany).

Since then, it has been identified in other localities, in pegmatitic environments (El Gigante, Córdoba, Argentina; Serra Branca, Paraíba, Brazil; Kreuzberg, Bavaria, Germany), but also in other geological contexts, especially hydrothermal ones (Clara mine, Oberwolfach, Germany; Adami #2 mine, Laurion, Greece; Perda Niedda mine, Sardinia, Italy), and in modern smelting slags (Genna Zinc Smelter, Letmathe, Germany).

In 2021, this mineral was found as whitish or yellowish crystals from "Qinglong Co." (Qianxi'nan, China), apparently analyzed using SC-XRD (single-crystal X-ray diffraction), PXRD (powder X-ray diffraction), EDS, and Raman spectrometry (Hercule Shen, mindat.org).

Later, in March 2025, new specimens from the same locality appeared, of greater size and quality (Boyuan Zhang, mindat.org), supposedly analyzed in Shanghai, indicating that the yellow color is due to traces of uranium.

METHODOLOGY

The sample studied in this report consists of two small groups of crystals (photos 1 to 3), measuring 11 x 5 mm and 4 x 4 mm respectively, of a lemon-yellow color, coming from the recent discovery in the mines of the Qinglong district (Qianxi'nan, China).

The Raman spectrometry analyses were performed with equipment from the company Brauch Analytische

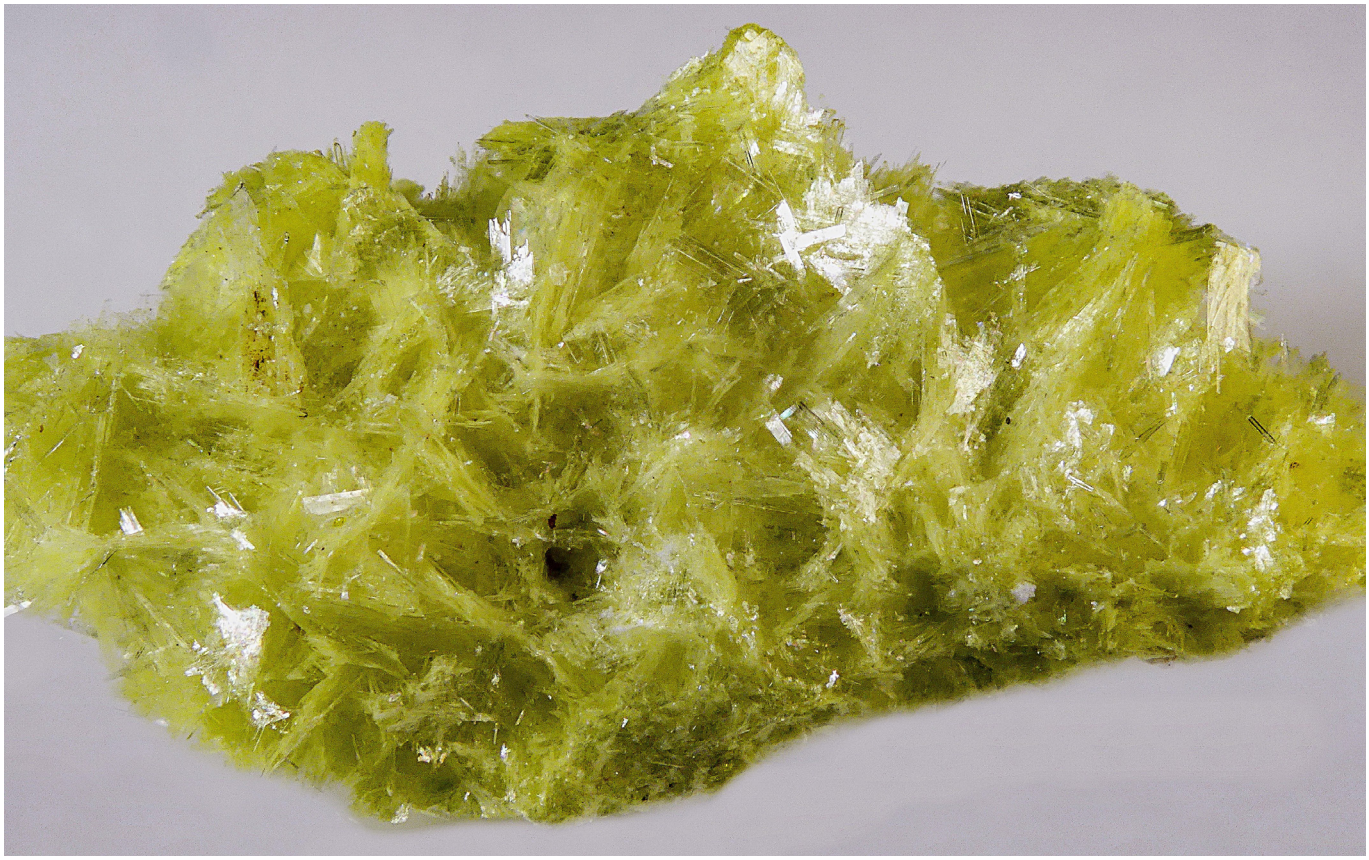


Photo 1. One of the specimens of carlhintzeite analyzed from Dachang, Qinglong (China), 11 x 5 mm.

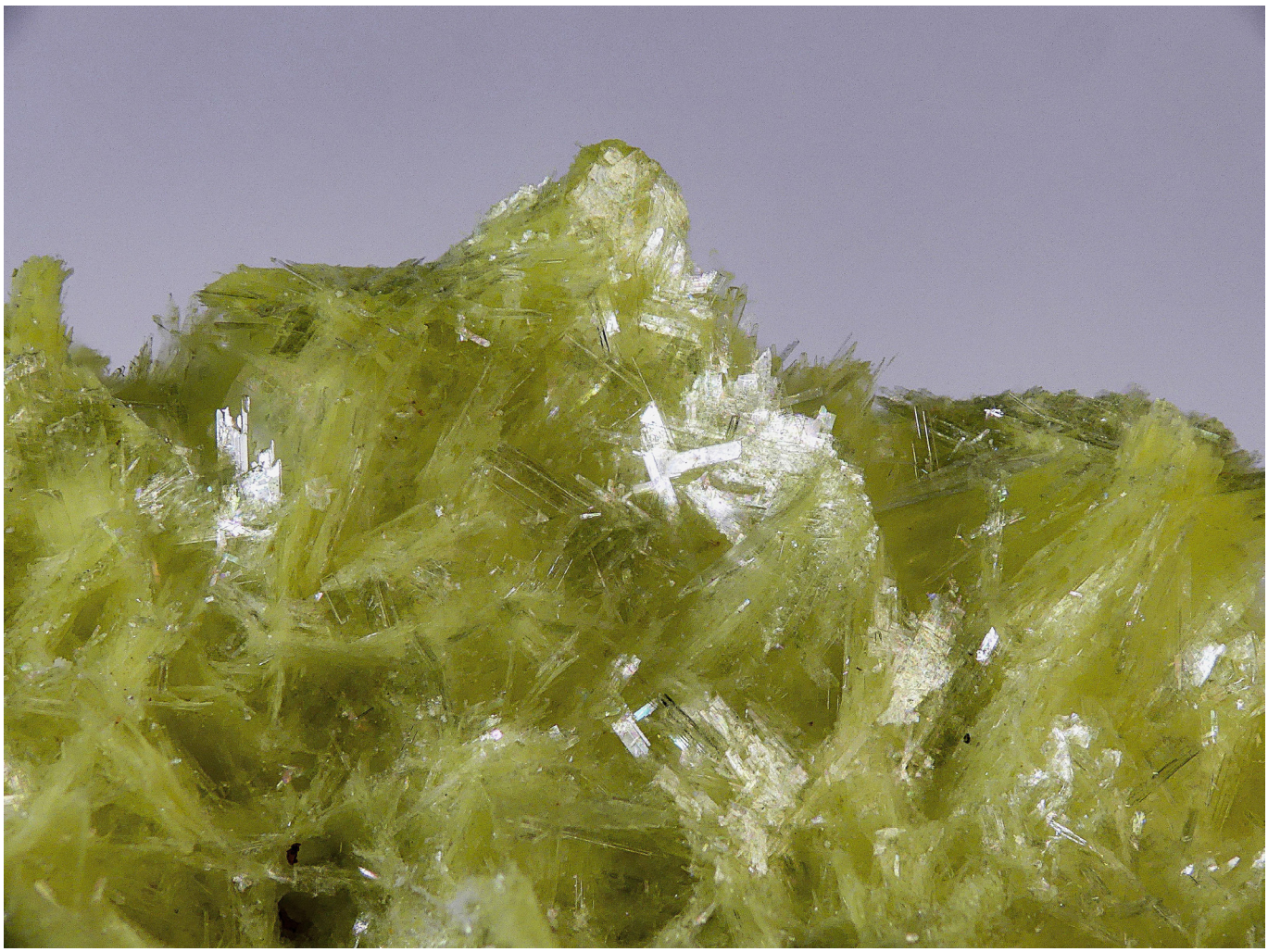


Photo 2. Detail of the specimen shown in photo 1 (FOV 8 mm).

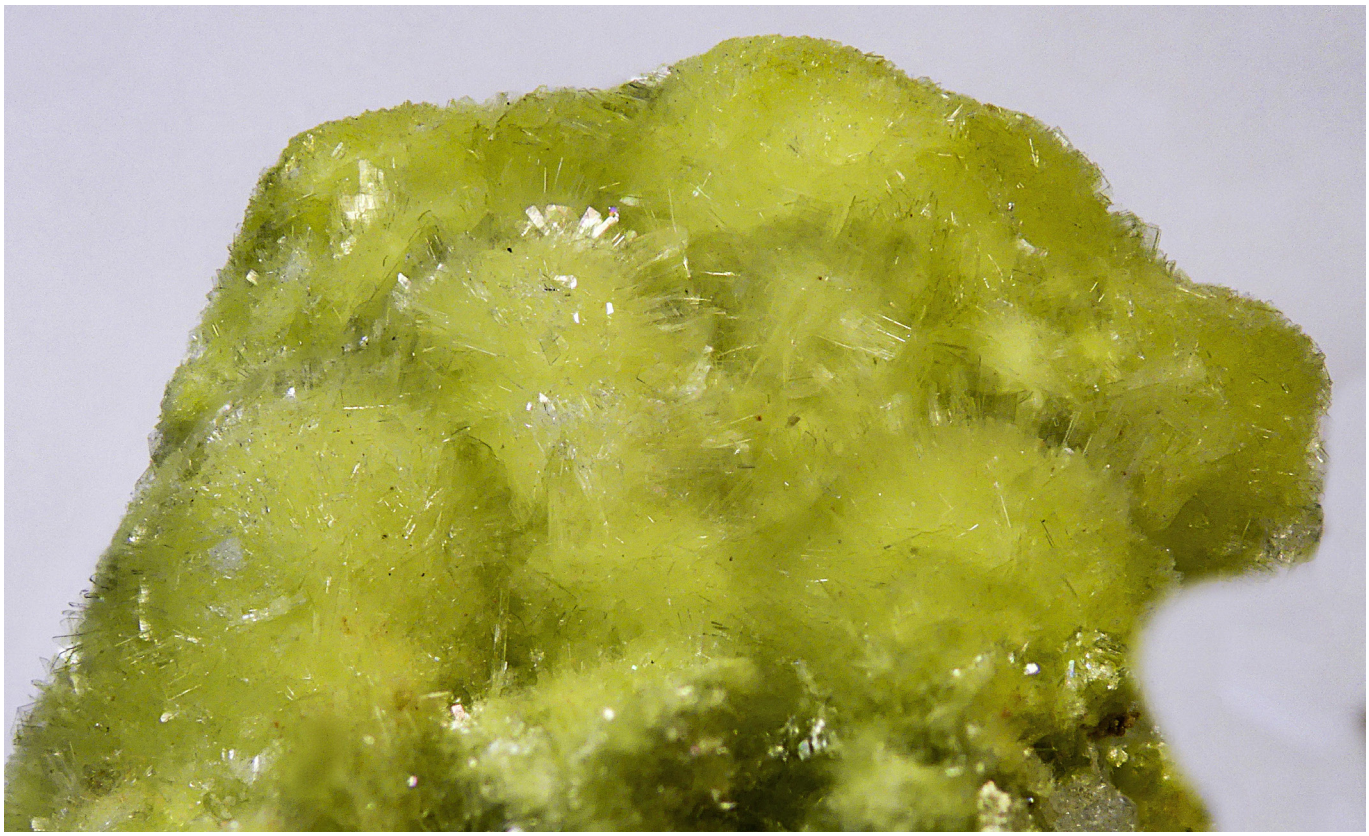


Photo 3. Second of the specimens analyzed from Dachang, Qinglong (China). 4 x 4 mm.

Photo 4. Group of colorless, tabular crystals of carlhintzeite from the pegmatites of Hagendorf (Bavaria, Germany), associated with strengite and rockbridgeite. The entire group measures 1 mm.

Geräte, model MA-RBE-VO2E, consisting of a green laser of 532 nm with a nominal power of 50 mV, with a frequency range of 100 to 4,000 cm^{-1}, and a resolution below 2 cm^{-1}. The detector was cooled to -15ºC for the measurements. All results were processed using proprietary software from Brauch.

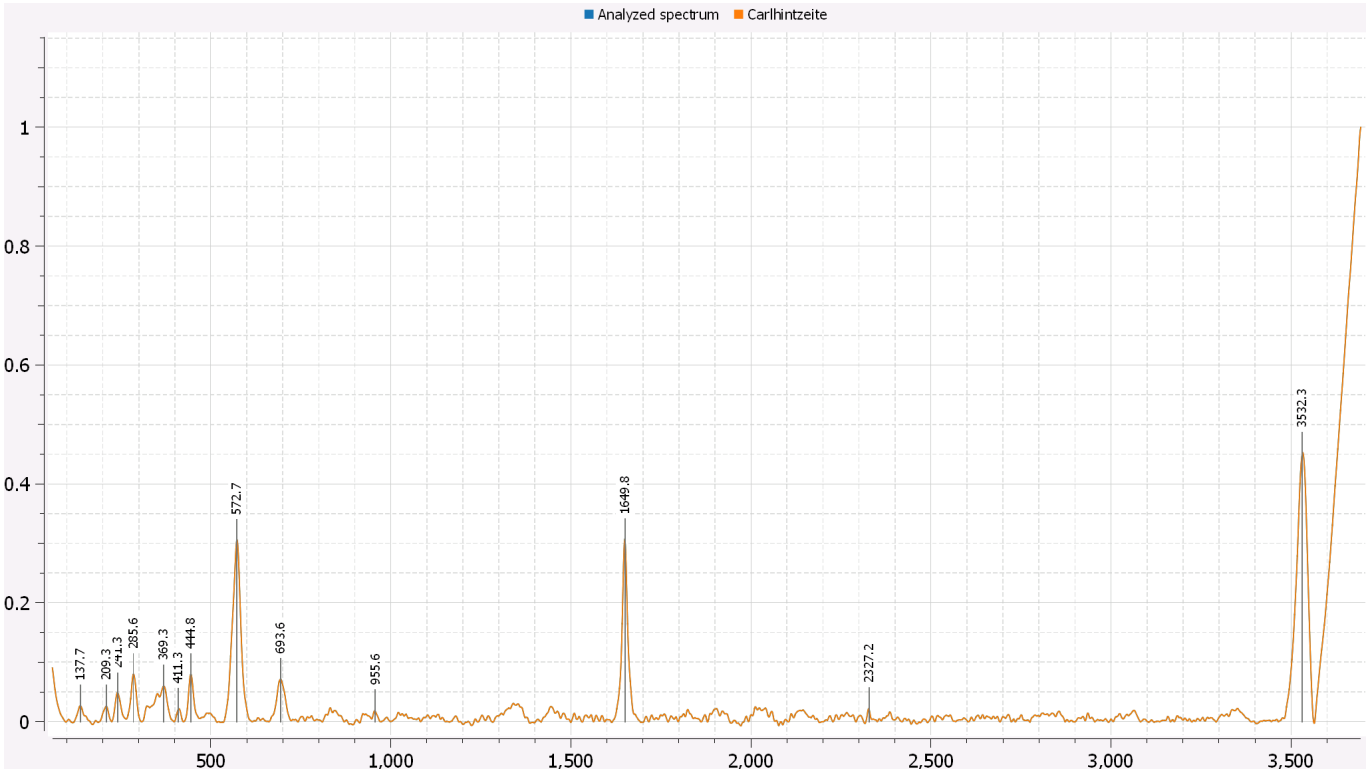
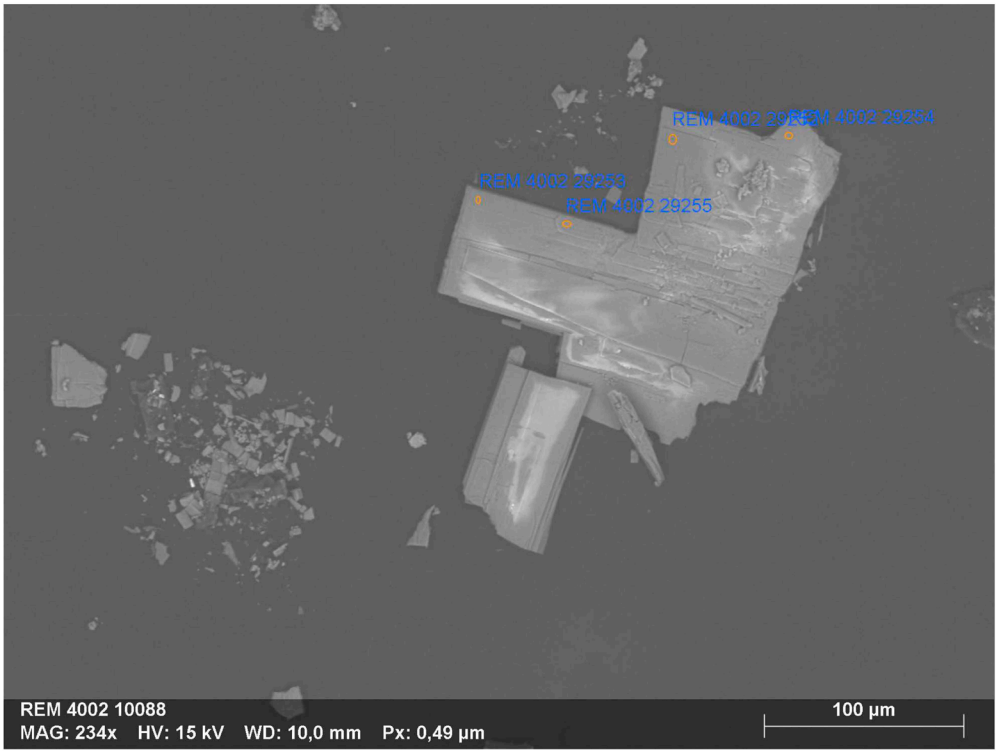


Figure 2. Raman spectrum of the analyzed carlhintzeite from Hagendorf (Bavaria, Germany).

REM 4002
Hagendorf Carlhintzeite



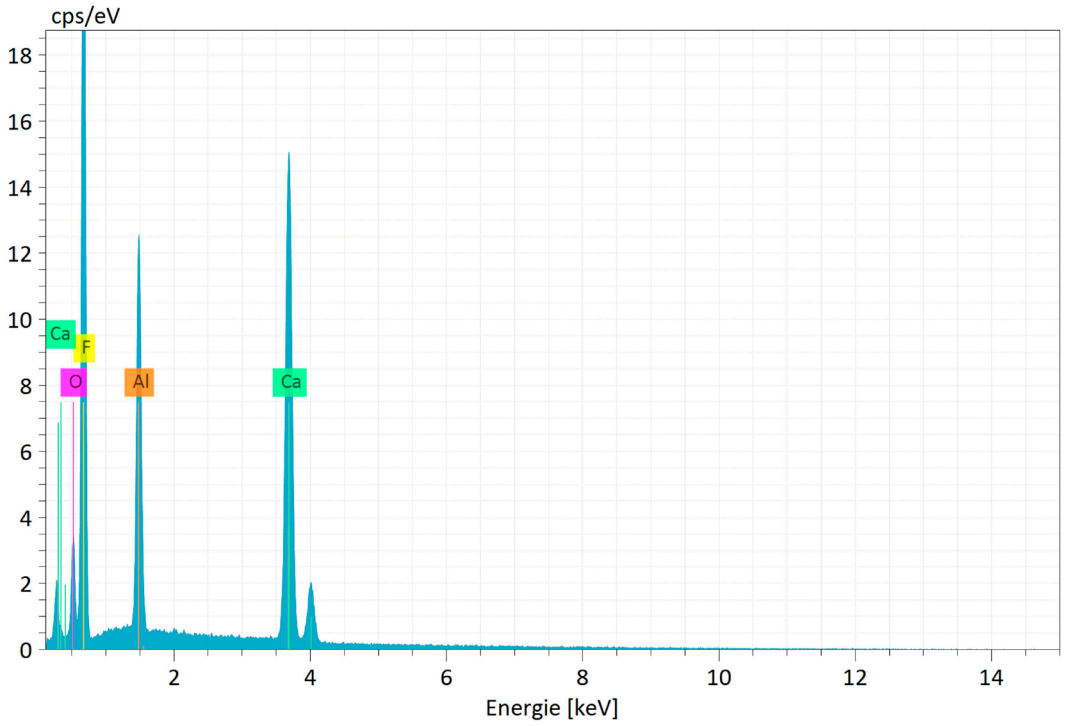


Figure 1a. SEM-EDS analysis of carlhintzeite from Hagendorf (Bavaria) carried out by C. Rewitzer.

Element	Ord. Z.	Lin. Ser.	Netto	Gew. [%]	Masse Norm. [%]	Atom [%]	abs. Fehler [%] (1 sigma)	abs. Fehler [%] (2 sigma)	abs. Fehler [(3 sigma)
Fluor	9	K-Serie	60393	52,08	53,07	63,48	6,08	12,16	18,
Kalzium	20	K-Serie	64390	29,06	29,61	16,79	0,90	1,80	2,
Sauerstoff	8	K-Serie	6537	8,73	8,90	12,63	1,33	2,66	3,
Aluminium	13	K-Serie	32607	8,27	8,43	7,10	0,41	0,83	1,
			Sum	98,14	100,00	100,00			

Element	Ord. Z.	Lin. Ser.	Netto	Gew. [%]	Masse Norm. [%]	Atom [%]	abs. Fehler [%] (1 sigma)	abs. Fehler [%] (2 sigma)	abs. Fehler [(3 sigma)
Fluor	9	K-Serie	56904	52,00	53,95	64,47	6,10	12,19	18,
Kalzium	20	K-Serie	55955	28,18	29,23	16,56	0,87	1,75	2,
Sauerstoff	8	K-Serie	5660	8,04	8,35	11,84	1,26	2,51	3,
Aluminium	13	K-Serie	31484	8,17	8,48	7,13	0,41	0,82	1,
			Sum	96,39	100,00	100,00			

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Figure 1b. SEM-EDS analysis of carlhintzeite from Hagendorf (Bavaria) carried out by C. Rewitzer.

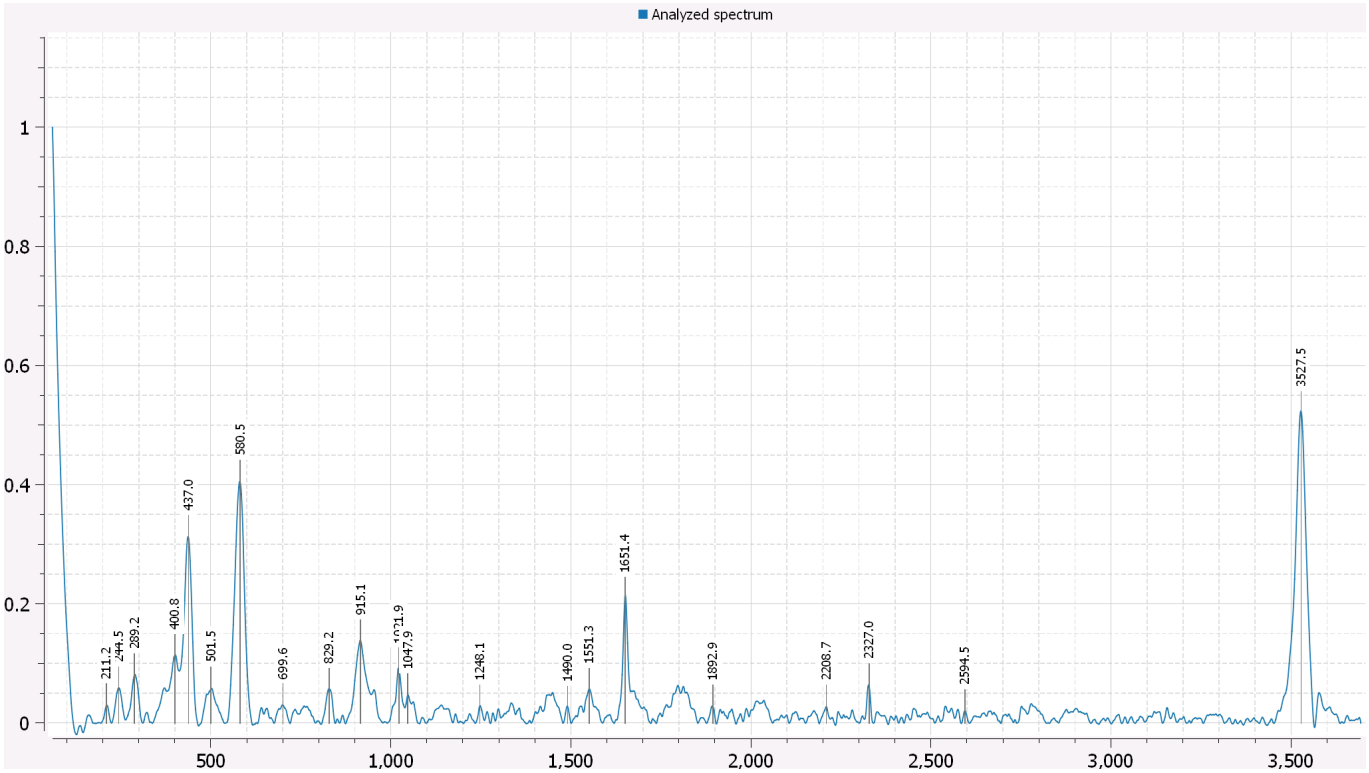

Figure 3. Raman spectrum of the analyzed carlhintzeite from Dachang, Qinglong (China).

Due to the absence of Raman spectra for carlhintzeite in the RRUFF database or in any other publication, a Raman analysis was performed on a sample from the type locality, the Hagendorf pegmatite, analyzed using SEM-EDS (C. Rewitzer, figure 1), consisting of colorless crystals with a tabular habit, in divergent groupings, on a rockbridgeite matrix and associated with tiny strengite crystals (photo 4).

The Raman spectrum of the carlhintzeite from Hagendorf is shown in figure 2.

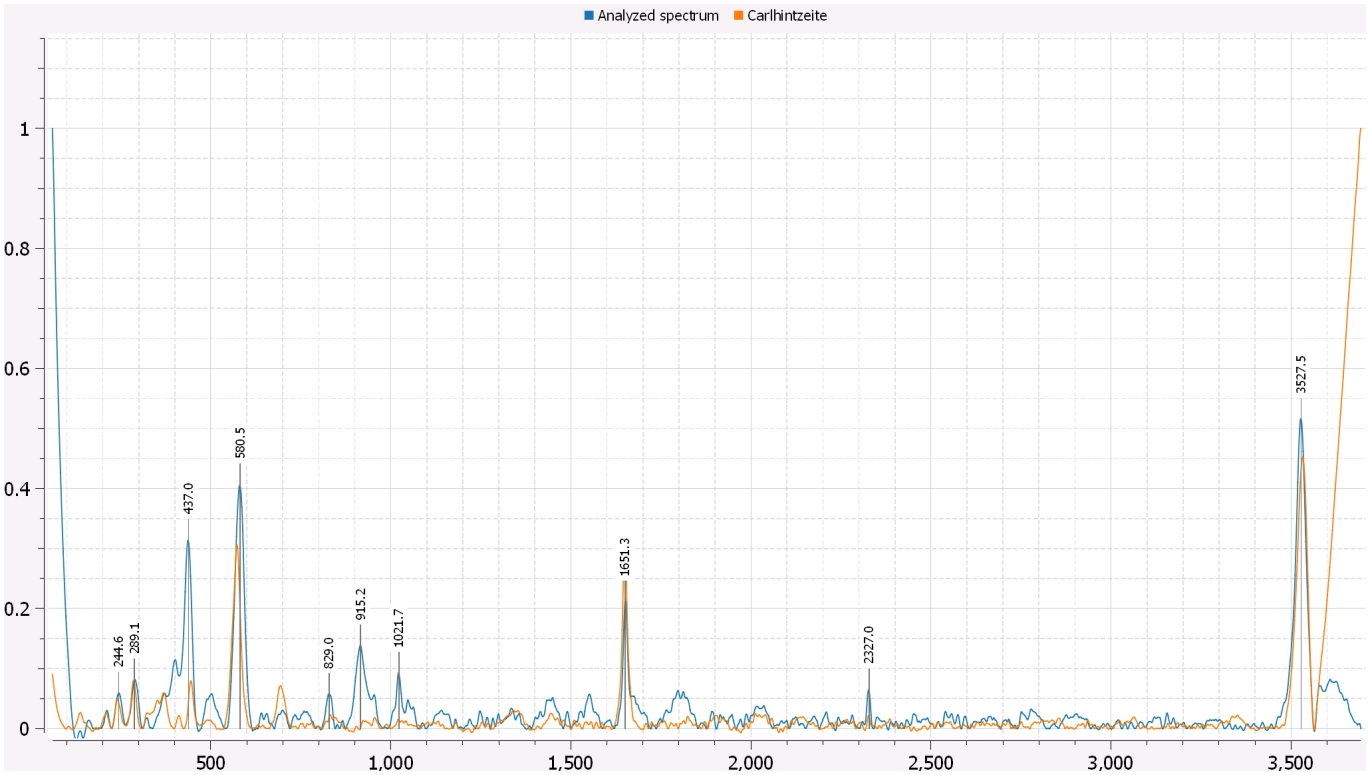

Figure 4. Comparison of the Raman spectra of Hagendorf carlhintzeite (orange) with Dachang carlhintzeite (blue).

RESULTS

The Raman spectrum of the analyzed sample (figure 3) shows a reasonably good similarity with the spectrum of carlhintzeite from Hagendorf (figure 4), while it does not show coincidence with other possible aluminofluorides, in particular with creedite or gearksutite, minerals with which it could be associated. In the Chinese samples some additional Raman bands are observed, of difficult interpretation, that do not appear in the spectrum of carlhintzeite from Hagendorf, perhaps attributable to a possible stabilization treatment (Dr. César Menor-Salván, personal communication).

Likewise, the analyzed sample has been compared with the Raman spectra of carlhintzeite from Dachang, which accompany the photographs of this mineral on the mindat.org website (Hercule Shen, 2021), retrieved in the year 2021, and which in turn were characterized by XRD.

CONCLUSIONS

The "new" specimens of carlhintzeite coming from Dachang can be considered as the best for the species at the present time, due to the size and quality of their crystallizations, surpassing even those from the type locality, the Hagendorf pegmatite (Bavaria, Germany).

They present the particularity of their intense yellow color, possibly due to trace elements (uranium?), not common for an aluminofluoride.

The characterization of the specimens recovered in 2025 has been carried out by Raman spectrometry, comparing with the Raman spectrum of a sample from Hagendorf which in turn was analyzed by SEM-EDS.

ACKNOWLEDGMENTS

To Jordi Fabre, for his revision, and to Christian Rewitzer, for providing a sample of carlhintzeite from Hagendorf and the SEM-EDS analyses of it.

To Dr. César Menor-Salván, for his valuable and accurate comments on the interpretation of the Raman spectrum of the Chinese samples.

BIBLIOGRAPHY CONSULTED

+ Dunn, Pete J., Peacor, Donald R., Sturman, B. Darko (1979): Carlhintzeite, a new calcium aluminum fluoride hydrate from the Hagendorf pegmatites, Bavaria, Germany. *The Canadian Mineralogist,* 17 (1) 103-105

+ https://www.mindat.org/min-900.html