Recent finds at Graulai Quarry

Henk Smeets

When you live in the very south of the Netherlands, as I do, and are part of a very active group of local micromounters, then the Volcanic Eifel in Germany is our backyard so to speak. The quarries are no more than 150 kilometres away, so just an hour and a half drive to get there. One can easily visit several in a day.

The area is dominated by volcanism which occurred in two time periods. The first period was in the Tertiary, between approximately 46 and 16 million years ago, while the second started in the Quaternary, about 1 million years ago. In the eastern part of the Eifel alone, in the area around the Laacher See (Lake Laach), the locations of some 80 eruptions are known.

The volcanism ended around 10,000 to 11,000 years ago, but there is still detectable volcanic activity in the region. In the lake you can still see emerging gas bubbles, and recent research (Kreemer, Blewitt and Davis, 2020) revealed that ground movements are still detectable, which indicates the presence of a rising mantle plume. The movements are the strongest in the vicinity of Nürburg but can even be measured where I live. Luckily of course there is no threat of an imminent eruption, but nevertheless, an eye is kept on the area.

Henk made the most of a gap in 2020 lockdown to crack a few basalt boulders and was treated to a feast of micros.

The *Minerale der Vulkaneifel (Minerals of the Volcanic Eifel, G. Blaß, F.J. Emmerich, 2018)* is available on a DVD and describes forty-nine collecting sites, mainly quarries that deliver basalt and lava for industrial purposes. The DVD states that ninety-nine different minerals are found – or have previously been found - although Mindat only lists 76 species.

Some of the quarries are no longer active, others are no longer accessible for mineral collectors because permission to collect is no longer granted, due to safety and liability issues - brought about to some extent by irresponsible and even destructive behavior of collectors in the past. Luckily the Graulai Quarry in the western part of the Eifel near Hillesheim is a positive exception. Together with five other quarries in the vicinity, the Graulai Quarry is exploited by a company, that until now always grants friendly permission to collect minerals on Saturday afternoons and Sundays. An e-mail to the management, stating the desired date and the number of persons usually suffices to receive a quick response.

The Graulai is like everywhere in the Eifel region in that almost all the minerals found will be micros. You definitely need a good loupe to see what is worth picking up. The collecting sites in the Eifel are a Nirvana for micromounters - but if you prefer larger pieces with crystals of naked eye proportions, you will be quickly disappointed. They just aren't there… In the past slightly larger crystals have been found a few times, but that hasn't been reported for many years. In 2014 I found a cavity of some 4 cm in a

basalt rock piece, which contained 7 mm long natrolite crystals, but that was a one time find, and a huge exception.

Additionally, you need to be lucky enough to be in the right spot at the right time: some parts of the Graulai contain many microcrystals, in other parts there is just nothing interesting. And because of the continuous quarry working, fresh material is never long at hand, as it will be quickly transported to shredding machines for further processing. In the course of the last 30 years my collecting friends and I have been there lots of times, and more than once we found nothing or only cavities with heavily weathered crystals. Other times we were luckier and found one good piece after another.

Graulai Quarry in June 2020 *Photo Jacques Feijen*

In 2020, in short periods between Covid-19 lock downs, we were very lucky. Because of the restrictions our first visit was in June, but we managed to go there three times in that summer. As always the good stuff was concentrated in a small part of the quarry, in an area of no more than 10 x 10 m, but that small area turned out to be very rich in cavities in the basalt. They contained a great number of different and freshly crystallized minerals. All the minerals described were found in 2020. Of course, complete certainty about the identity of the minerals can only be obtained by full analysis of the specimens, but all the very experienced collectors in our local group, as well as some other experts, agree on the visual identification of all the specimens. All photos are made by me and can be seen on my website www.tomeikminerals.com.

Åkermanite, FOV 2 mm

Åkermanite belongs to the melilite group, together with gehlenite, and is therefore a calcium silicate. The tetragonal crystal shape is clearly visible in the photo and the colour is characteristic. Åkermanite is the most common melilite group mineral in the quarry and gehlenite hasn't been found yet. The specimen on the photo has been fully analysed.

Alumohydrocalcite is relatively abundant in the Graulai, but it is often weathered. Mostly they are seen as spherical aggregates, sometimes they are arrays of well separated crystals, of a creamy white to faint yellow colour.

Alumohydrocalcite on nepheline, FOV 1 mm

Aragonite on nepheline, FOV 1 mm

Aragonite is very abundant, nearly always completely transparent, pointy and sprayed.

Calcite is not as common as one might expect. So far I have only found calcite in scalenohedric habit ("dog tooth") as in the picture.

Calcite, FOV 5 mm

Flörkeite, FOV 2 mm

Flörkeite is thought to be rare, but maybe that's not altogether true. The problem is distinguishing it from the more abundant ball shaped phillipsite, to which flörkeite is chemically closely related. The visual difference is that the end faces of monoclinic phillipsite look like a saddleback roof, while the end faces of triclinic flörkeite are like a flat roof.

Fluorapatite is everywhere, as colourless needle like crystals, in this case partly covered by probably phillipsite.

The challenge is to find remarkable and peculiar ones.

Fluorapatite with (probably) phillipsite, FOV 0.5 mm

Gonnardite, FOV 2 mm

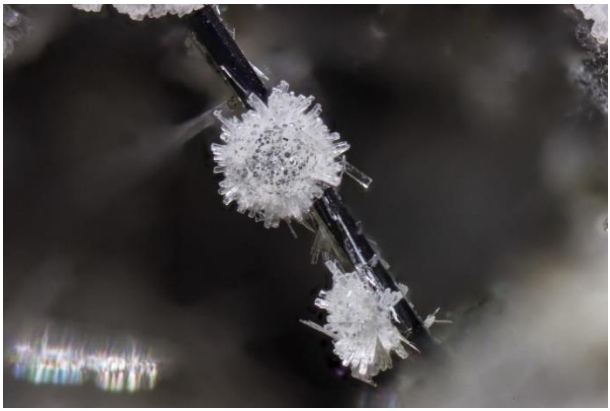
Gonnardite: white, ball shaped, woolly appearance - characteristics of the species. Gonnardite is a zeolite, and member of the natrolite subgroup.

Götzenite with perovskite and nepheline, FOV 2 mm

Götzenite: unless this is an amorphous substance, then götzenite (a "sorosilicate" of titanium with the formula $NaCa_6Ti(Si_2O_7)_2OF_3$) is the only candidate for these creamy white, lathlike crystals.

Magnetite with some fluorapatite needles, FOV 1 mm

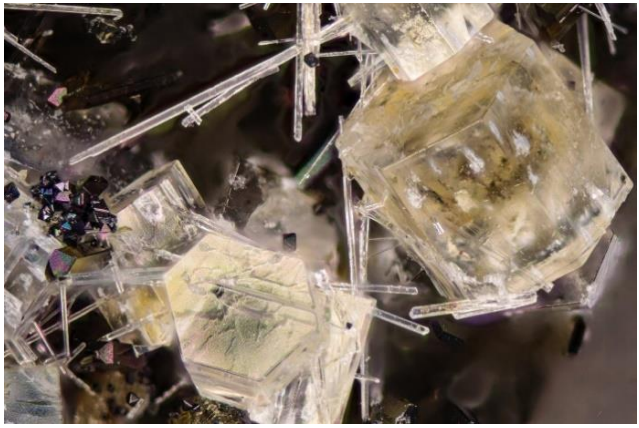
Magnetite is mostly small and often dull, but sometimes the tiny crystals are shiny on a nice contrasting background.



Natrolite on clinopyroxene, FOV 1 mm

Natrolite forms elongated crystals that can be recognized by their orthorhombic shape with slightly pyramidal end faces. When these are visible, natrolite is fairly easy to distinguish from other similar minerals.

Nepheline is even more abundant than fluorapatite. The hexagonal crystals are unmistakable, and they are almost always transparent – although finding crystals that are unweathered is often a problem.



Nepheline with fluorapatite and magnetite, FOV 4 mm

Perovskite, dendritic aggregate, FOV 3 mm

Perovskite is without any doubt the most wanted mineral in the Graulai. It is found as single or piled blocky crystals, as well as dendritic treelike aggregates. When you see perovskite with its characteristic colour, you can't confuse it with anything else – but finding it in the jumble of many other and larger crystals is another matter.

Smectite-group on nepheline, with magnetite, FOV 1 mm

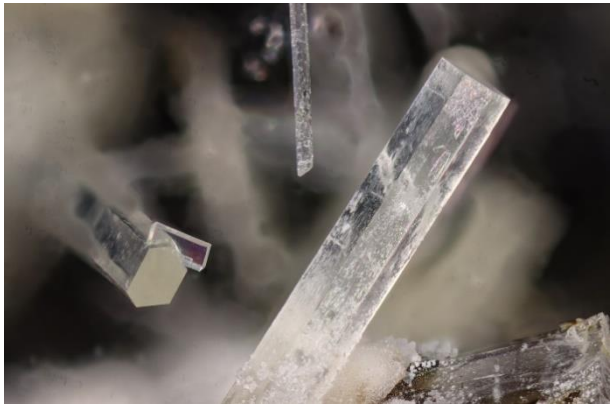
Smectite is the group name for a few different clay minerals such as montmorillonite, nontronite and saponite. The orange colour and the caviarlike appearance are conspicuous and that helps the determination – but without full analysis this example can only be named as one of the smectite group.

Thaumasite could be confused with other hairy white crystals, like aragonite or ettringite, but the woolly, cottonlike appearance makes thaumasite the most likely identification, – or perhaps this is a member of the ettringite-thaumasite series.

Thaumasite, or ettringite-thaumasite series, FOV 2 mm

Thomsonite on nepheline, FOV 0.5 mm

Thomsonite, or to be precise, thomsonite-(Ca), is relatively abundant in the Graulai, mainly as transparent, smooth ball shaped structures, often coated with other minerals. This peculiar specimen is unmistakably thomsonite, as can be inferred from the flat orthorhombic end faces of the individual crystals which have formed a smooth ball - typical of thomsonite.



Single willhendersonite-crystal on nepheline, FOV 1 mm

Willhendersonite can only be observed under large magnification. The crystals are tiny, but under the microscope single crystals are recognisable (if you know where to look!). They are so small that they can easily be missed. The triclinic crystals are often almost rectangular, platy and with some thickness.

Sources

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Websites

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Mineralogy Database, www.mindat.org
Smorf Crystal Models, www.smorf.nl
Tomeik Minerals, www.tomeikminerals.com

Locality Snippet – Csódi Hill, Dunabogdány, Hungary

Steve Sorrell

This randomly selected mineral specimen from my collection comes from Csódi Hill, Dunabogdány, Pest County, Hungary, a quarry (or historically, a series of quarries) in what was originally described as an *andesite laccolith*.

However, there is a problem with this description as andesite is an extrusive volcanic rock, while a laccolith is an intrusive body with a dome-shaped upper surface and a level base. You can't have extrusive and intrusive. It would appear that it was