Mineralogical Society of Western Australia Inc.

To encourage mineralogical study by amateur and professional alike and, in so doing, discover, document and preserve the Earth's, and in particular Western Australia's, natural history

NEWSLETTER 114
March 2026

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EDITORIAL

Welcome to issue 114 of the MinSocWA Newsletter. We trust you do enjoy receiving and reading these.

Our President called out to the membership at our last March gathering to ask for volunteers to assist in assembling the Newsletter, following the stepping down of Wendy Hampton, our previous Newsletter Editor – whom we thank for her contribution over two years.

We have received no response from that appeal, so we are now asking the broader membership if anyone could spare a little time – only for 4 times a year! – to help your Society with putting the Newsletter together.

Other roles on the committee are also vacant, and we do need your help to keep the Society going. Please contact me if you are interested in contributing.

Angela Riganti
Acting Newsletter Editor

January 2026 – *Tools of the trade: traditional geological and mineralogical techniques applied in a commercial setting… or… Robert looks at rocks!*

Report compiled by Susan Stocklmayer

Photos © Dr Robert Madden

Dr Robert Madden, Principal Geologist and Petrographer at *Microanalysis Australia*, presented his talk at our General Meeting on 21st January 2026.

The talk was a progressive journey through petrographic and mineralogical methods for examination and testing of rocks and minerals, illustrated by colourful petrographic thin section images.

The journey through his world of rock and mineral consultancy began by discussing the rapid, fundamental information gathering used when an unknown specimen is presented. This includes observations about the general appearance of a specimen noting colour, textures, heft, hardness, and general and uncommon features. This basic groundwork provides an important collation of visual and physical properties of specimens. Importantly, it was stressed that visual context and experience are vital in knowing how to approach an unknown sample. Indeed, Robert quoted a famous saying in geology: “the best geologist is he who has seen the most rocks”. Robert reflected on his experience gained through his degrees, PhD, lecturing and exploration geology career leading him to his role as a petrographic consultant and personal goal to ‘see all the rocks”.

The talk followed a progressive discussion through the instruments and techniques principally used before leading us into some case study applications. The important instruments introduced for optical microscopy included a stereomicroscope for the initial 3D observations, the petrographic microscope equipped with polarising filters for transmitted light observations, and a reflectance tube for observing opaque (ore) phases on specially prepared polished sections.

The petrographic microscope

The fundamental properties of light and how it interacts with crystalline phases were outlined to demonstrate the kinds of mineral properties that can be observed when using a petrographic microscope. An overview of how geological thin sections (i.e. 0.03 mm thick slices of polished rock attached to thin glass slides) are made was given. Preparation of these by both the traditional labour-intensive manual and by advanced automatic mechanical methods was explained. In the former instance, a small piece of rock is adhered to a glass slide and, by slicing and grinding, is reduced to its final exact thinness. The latter method achieves similar results and manages greater numbers of thin sections to be produced quickly. Microscope sections are required to be made to the standard thickness of 0.03 mm (30 microns) so that the interference colours and birefringence of anisotropic minerals can be accurately compared to the Michel-Levy birefringence chart — recognizing the order of colour and intensity are an important step in the petrographic identification of minerals. Microscope slides, when prepared without a cover slip can also be used if further testing (e.g. colouring) is required by specialized advanced instrumentation techniques.

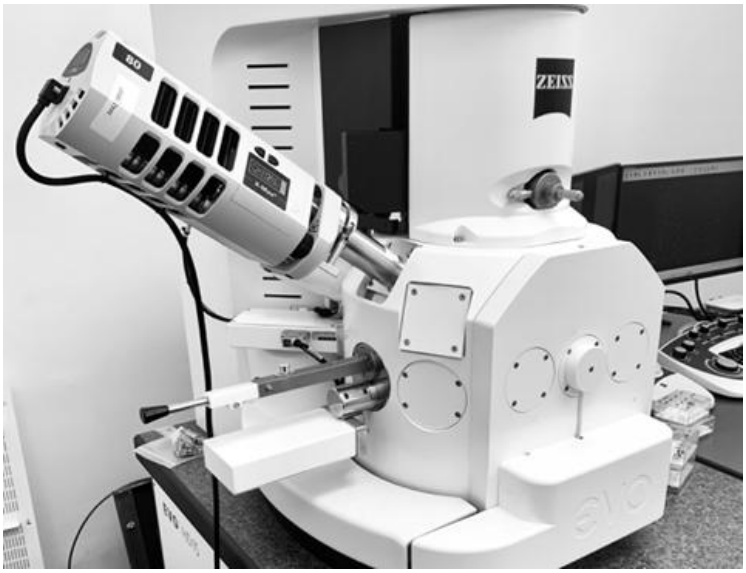
Optical mineralogy has many advantages in allowing observations of the textural relationships of minerals in a rock and the petrogenetic (rock forming) sequences. Its limitations are in identifying minerals that are sub-microscopic, such as clays and other fine-grained alteration mineralogy. The precise chemistry of minerals may also be of importance in reports.

The other advanced methods discussed were *X-ray diffraction* (XRD) and *scanning electron microscopy* (SEM) with *elemental diffraction spectroscopy* (EDS).

X-ray diffraction data are required for the identification and confirmation of minerals and are generated based on the interaction of specific wavelengths of X-rays with crystallographic structures. Preparation of a sample for x-ray diffraction work requires a finely and precisely ground powder to ensure that minerals are in random orientations, crystallites have the same size, and phases are homogenously distributed. The process can involve mechanical jaw crushers, puck mills, micronisers and hand-grinding by agate mortar and pestle.

Internal mechanics of an x-ray diffractometer

Data from the x-ray diffractometer produces results that are displayed graphically on the computer screen. Because every mineral has a unique crystal structure, it produces a unique set of x-ray diffraction peaks, each corresponding to diffraction from a specific set of crystal planes. XRD patterns are represented by intensity (counts) on the Y-axis and 2ϑ (theta, or diffraction angle), on the X-axis. XRD results are interpreted as minerals by matching peak positions (d-spacing) and relative intensities in the diffraction pattern to known reference patterns, identifying single or multiple crystalline phases present in the sample and in what abundances. Results can be interpreted together with petrographic optical inspection.

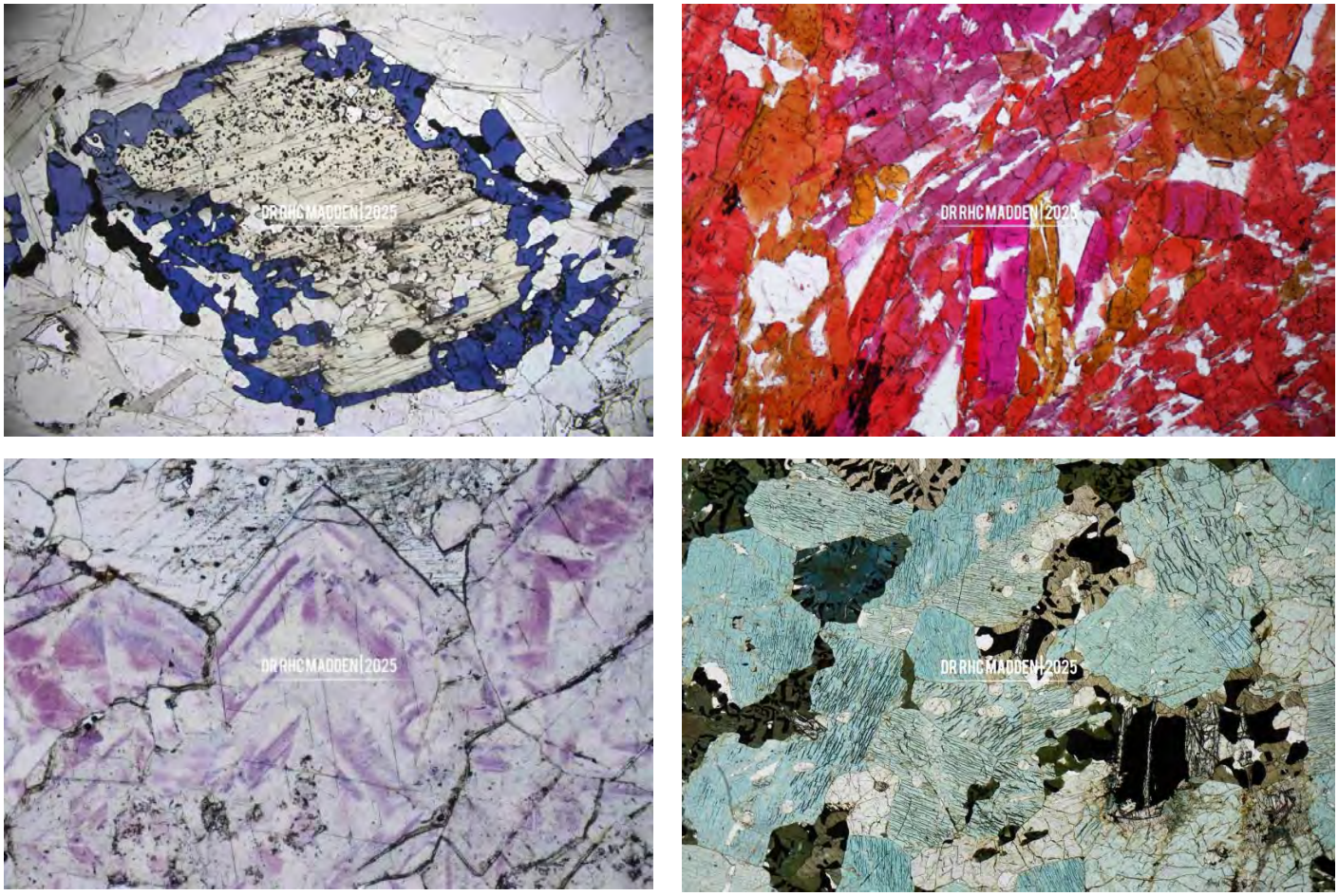


SEM-EDS instrument

Scanning electron microscopy (SEM) scans the surface of a rock using an electron beam. For greater accuracy, surfaces are prepared for scanning with a non-destructive coating, often carbon. Electrons interact with atoms in the sample, producing signals that contain information about the surface topography and composition. High magnifications can be achieved of up to 1 nanometre (1000 nm in a micron, 1000 microns in a mm!) usually displayed as black-and-white images on a screen, where the higher the atomic number of the site of interest, the brighter the image will be. Scans will show surface topography, microstructures, and crystals in 3D. The specific diffraction patterns created by the electron beam also reveals the elemental composition of a site of interest allowing the full composition of a sample to be calculated.

The importance of petrographic interpretation together with high-tech instruments was emphasized. Case studies were presented for petrographic, XRD, and SEM-EDS investigations to reveal how diligent and skillful analytical work can prospect for new ore targets, identify critical mineral interactions and metallurgical processing pitfalls, characterise complex samples and find hidden health hazards or trace precious metals.

In addition to the clear and concise technical storytelling, the presentation was supported by an art gallery of unusual and spectacular minerals viewed under the petrographic microscope. Some highlights included the vivid colours and pleochroism of piemontite, grandidierite, fluorite and yoderite.



Clockwise from top left: yoderite corona on kyanite; piemontite; grandidierite-tourmaline-spinel and Blue John fluorite.

For members who have a background in geology, the talk was a reminder of the aesthetics of rocks shown in thin section and the power and utility of a skilled specialist analysing 'ordinary' samples. For members without the advantage of this technical background, the images and storytelling provided a colourful visual sensation and learning opportunity.

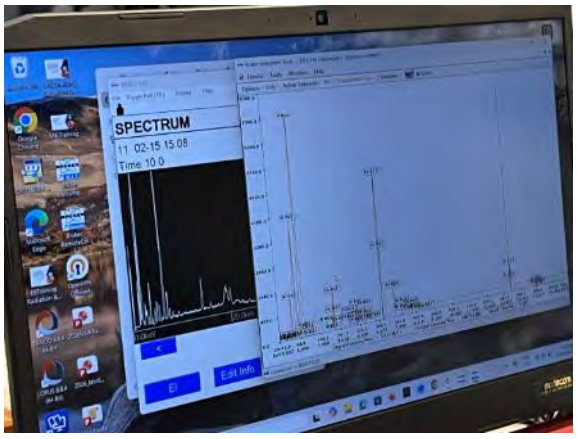
Robert showcases a lot of his work and thin section art on Linkedin and Instagram and welcomes mineral and rock discussions through these platforms. He can also be contacted for the sale of his highest quality artistic prints which now populate homes and offices around the world.

February 2026 activity – pXRF analysis

Thanks to Bruce Groenewald and Jason Bennet and their respective employer companies for making pXRF instruments available on Sunday, 15 February 2026, and for assisting members with mineral identifications. The activity was also attended by a few members of Gemmological Society WA Branch, who very generously opened the doors of Gemmo's House for this event.

About 20 people participated. The event kicked off with a presentation on safety aspects of these instruments — as they use radiation — as well as a brief introduction to the advantages and disadvantages of this technique.

Members and GAA-WA visitors then had the opportunity to have their unidentified specimens analysed. The technique returns a broad geochemical analysis of all elements from magnesium to uranium present as main components of the mineral, which allows identification of some minerals or ruling out some possibilities. In a more advanced application, the ionic ratios of the elements can be determined to allow more specific identification, for example exact classification of a recognized amphibole in the whole spectrum of physically almost identical minerals. Several people remarked on just how useful the pXRF analyses had been for their samples.



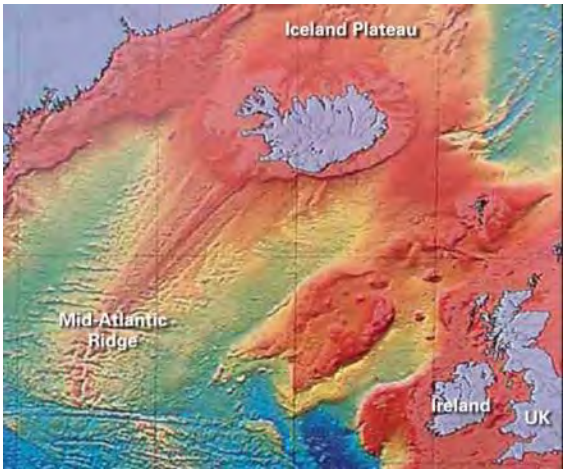
March 2026 – *Mineralogical (and other) adventures in the Land of Fire and Ice*

Compiled by Vernon and Susan Stocklmayer

MinSocWA members Angela Riganti and Bruce Groenewald recently visited Iceland and, on Wednesday 11 March 2026, presented members with their interesting geotourist experience there.

Iceland, often referred to as the Land of Fire and Ice, has become a popular tourist destination with visitors intent on viewing one of the periodic volcanic eruptions as well as admiring the stark scenery while enjoying bathing in warm thermal springs. However, when Iceland is examined through the eyes of a geologist or mineral collector, it presents a far-more fascinating picture.

A bathymetric map shows Iceland positioned on a plateau formed by a LIP (large igneous province) in the northern Atlantic Ocean that straddles the Mid-Atlantic Ridge, the longest mountain chain on Earth. The Arctic Circle, at 66°30', includes a portion of western fiords in the northern part of the island.



Source: https://geologylearn.blogspot.com/2016/03/relation-of-volcanism-to-plate-tectonics.html

Iceland is geographically closer to Greenland than any of the European countries. At slightly over 100 000 km^2 it's about 1.5 times the area of Tasmania, but has a highly indented fiord coastline. With a total population of slightly less than 400 000 people, Iceland has one of the highest urbanization rates in the world (94%) with the majority living around the coastline, leaving the large area comprising the central highlands virtually uninhabited and relatively undeveloped.

The first recorded settlers on Iceland were Norwegians in 874 AD. There are, however, interpretations of medieval texts that suggest these pagan Norsemen were preceded by a group of monks. The Island residents accepted Norwegian rule in the 13th century. By the 14th century Norway and Denmark were united under one monarchy. Sweden became part of the later Kalmar Union to which the three countries were party. After this union was eventually dissolved, Denmark effectively governed Iceland until the 20th century. In 1944 the Icelandic parliament voted to become a republic and therefore ended the remaining formal ties to Denmark.

For those tourists who choose to remain longer than the usual 2-3 days, visiting scenic spots in and around Reykjavik, it is recommended to take a 10-15 day drive in an anticlockwise direction (in summer) around the coast on the Ring Road, staying at a variety of hotels, boarding houses or in private homes as paying guests. This allows one to visit numerous places of interest along the way.

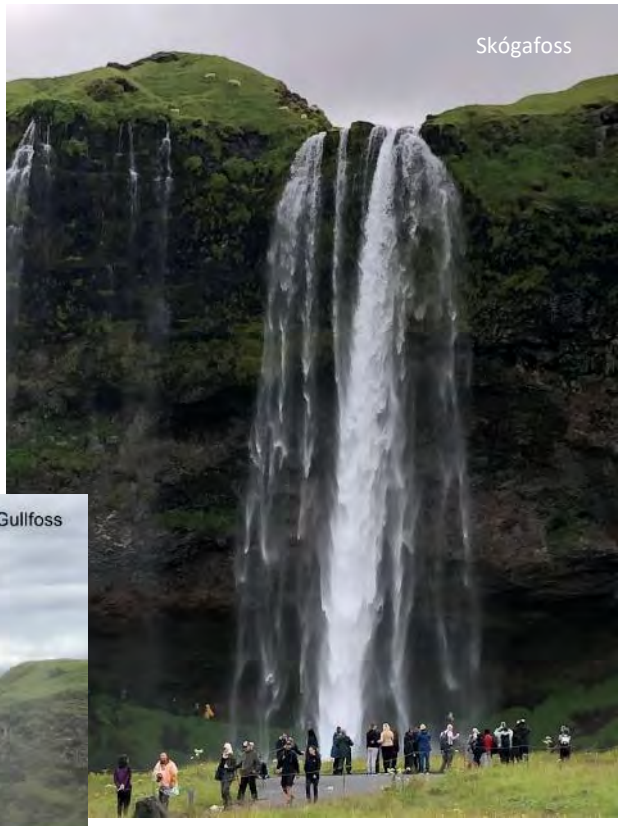
For a geologist, one of the more interesting sights is at Thingvellir, a short distance outside of Reykjavik, where the vertical-sided basalt walls bordering a ravine mark one of the fissures at the juxtaposition of two major tectonic plates, the North American and Eurasian plates. It is still active and widens by about 2-3 cm every year as the plates slowly move apart. Thingvellir is also the site of the original Icelandic parliament, the Althing.

Travelling on from here abundant volcanic features can be observed: the ropey surfaces of pahoehoe lava flows; the columnar basalts (organ pipes) that provided the inspiration for the striking architecture of the Hallgrímskirkja Lutheran parish church in Reykjavik; the expansive lava fields that can be carpeted by mosses 40 to 60 cm in thickness; impressive black mountains, many showing evidence of multiple lava flows, and rare ignimbrites; volcanic cones, some of which contain lakes within their

craters; the some 30 active volcanic edifices; beaches with black lava sands; and numerous lava tubes, pipes and tunnels of various dimensions. Amongst this scenery, a fragile ecosystem survives to provide pockets of greenery with a few trees in some areas. Birdlife is abundant, varied and evident particularly around the shores however, the only native land mammal is the Arctic fox.

Geothermal activity is ongoing with active and dormant geysers, like Strokkur, which erupts every 8-10 minutes; fumaroles, mud pools and sulphur deposits producing the stench of sulphuric acid. The ubiquitous trapping of the natural thermal energy provides for power and heating with waters from a power plant creating sites such as the Blue Lagoon thermal pools, a tourist favourite.

Ice covers about 11% of the land area and is the source of numerous glaciers. The Vatnajökull ice cap is the largest in Europe by volume. Glaciers can be viewed in many places including the Jökulsárlón Glacier Lagoon where a large glacier calves into a deep, fresh-water blue lake. The product of melting glaciers is apparent and Iceland has abundant fresh water. There are numerous impressive waterfalls including the spectacular Godafoss and Dettifoss falls, and the Seljalandsfoss falls which can be completely circumnavigated on foot at the base of the falls.

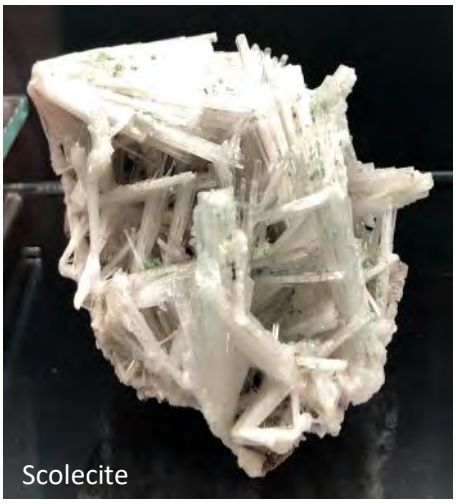


Skógafoss

Gullfoss

Unlike Australia where geological and mineralogical museums, gem and mineral shops and societies abound, there is almost no apparent collecting and trading of minerals in Iceland. The main reason for this is that rock and mineral collecting is severely restricted — the country values its geological heritage closely to prevent damage to protected or sensitive sites. The advice given by Mindat is 'take at your own risk'.

Mindat lists 162 minerals from Iceland, including 10 that are type minerals. Apart from all the usual rock-forming minerals, the list includes 16 zeolite group species. The 2014 book on *Icelandic Rocks & Minerals* by Saemundsson and Gunnlaugsson provides a comprehensive record.


Scolecite


Thomsonite

The Natural Science Institute of Iceland (NSII) in Reykjavik maintains a comprehensive collection of all known Icelandic rock and mineral species from various geological formations. Apart from that, there are few mineral collections on display on the island, the most significant of which are Audun's Mineral Collection and Petra's Stone Collection at which a large array of agates and chalcedony materials collected over decades are displayed in what was a private house and garden. Souvenirs can be purchased.

Eggin í Gleðivík – art installation

A unique rock exhibition at Gleðivík, or Merry Bay comprises an outdoor art installation that features 34 outsize granite eggs mounted on blocks along the harbour, each representing the egg of a native bird species of the region.

Iceland spar, the unusually pure and transparent variety of the mineral calcite takes its name from the country. It was first sourced from the Helgustaðir quarries sited on a hillside on the east coast; extraction started in the late 17th century and from here Iceland spar was exported to Europe. Iceland spar has provided an important history and legacy following the scientific observations of its optical properties by many leading scientists of the time and the consequent optical applications of calcite's exceptional optical double refraction.

HELGUSTAÐIR QUARRY NATURAL MONUMENT

Helgustaðir can be considered as one of the most important places in Iceland in an international perspective and one of the most important mineral locations on Earth.

Without the discovery of Icelandic spar crystals, numerous advances in optics, organic chemistry, crystallography and petrology would have been delayed. The Icelandic spar crystals from Helgustaðir led to changes in the world due to their role in various scientific and technological developments during 1780–1930. During 1855–1872, around 300 tons of Icelandic spar crystals were extracted and exported from the Helgustaðir quarry.

During the 1950s mainly crushed Icelandic spar crystals or "rosti", was worked from the quarry. The "rosti" was used for rendering of houses along with other rock types. The Icelandic National Theatre was coated with "rosti" from the Helgustaðir quarry around the year 1933. In 1995, the Helgustaðir quarry was designated a protected area along with the surrounding area and is now a national monument due to its unique geological formations. The Environment Agency oversees the entire area. Besides the quarry pit, remnants of human structures from this period can also be seen, e.g. motors, rinsing tubs, hut foundation and sieve.

People are welcome to view the Icelandic spar crystals, however, all ground disturbance and removal of the Icelandic spar crystals is strongly prohibited.

Please help us to protect the quarry and allow others to experience the wonders of Helgustaðanáma. Do not take the Icelandic spar crystals.

Specimen from the Natural History Museum in Milan

WAM mineralogy data package now online

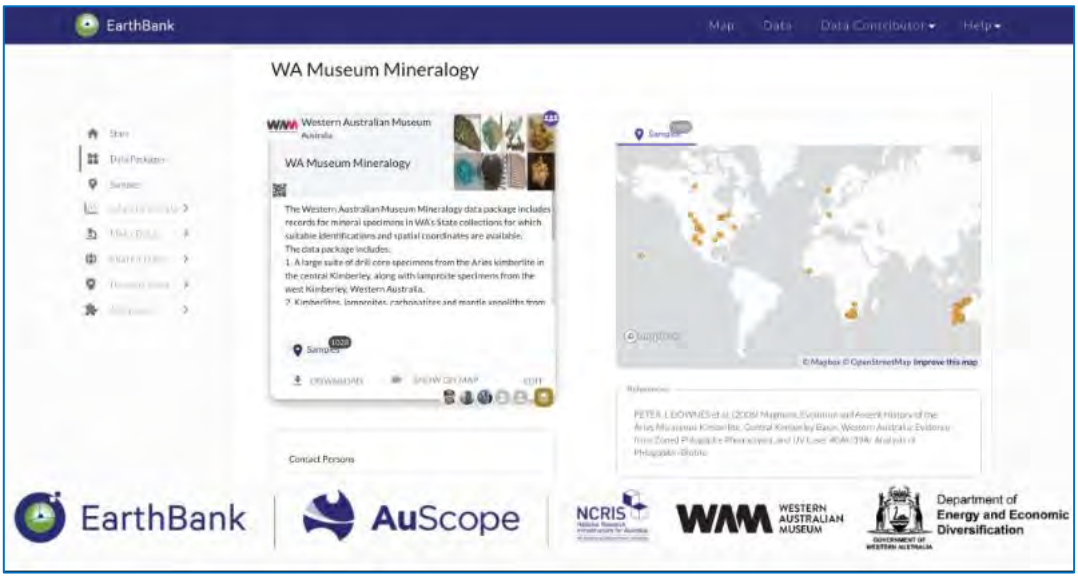
Submitted by Angela Riganti, modified from AuScope EarthBank Linkedin post

The pilot *Western Australian Museum mineralogy data package* is now live on the AuScope EarthBank platform — this publication makes 1028 curated geological specimens from WA's state collections discoverable online, opening up a rich mineralogy dataset for researchers, industry and the broader geoscience community. This is a strong example of how digitizing museum collections can unlock new research value by making important geological materials far more accessible for research.

The WAM collection includes rocks, minerals, ores and xenoliths from key mining regions such as the Pilbara, Kimberley and Goldfields, as well as globally significant geological localities. Each record includes verified identifications, coordinates, and contextual metadata including lithology, sampling method and stratigraphy. The dataset features a wide range of economically important materials, including kimberlite, gold, copper, malachite, pegmatite and volcaniclastic breccia, alongside lamproite, nickel sulphide ore, carbonatite, chrysocolla and mantle xenoliths. Some standout inclusions are:

- Aries kimberlite drill core from the central Kimberley
- Lamproites from the west Kimberley
- Kimberlites, carbonatites and mantle xenoliths collected by diamond geologist Bram Janse from Africa and North America
- Sulphide ores from Nova, Cadjebut and Goongewa
- Secondary copper minerals from DeGrussa and Whim Creek
- Pegmatites from Wodgina, Tabba Tabba and Pilgangoora
- Native gold specimens from Western Australia, Queensland and Papua New Guinea

The data package can be viewed and explored via the link https://lnkd.in/gPRXrgyZ.
A free registration allows the data package to be downloaded.



Minerals on stamps

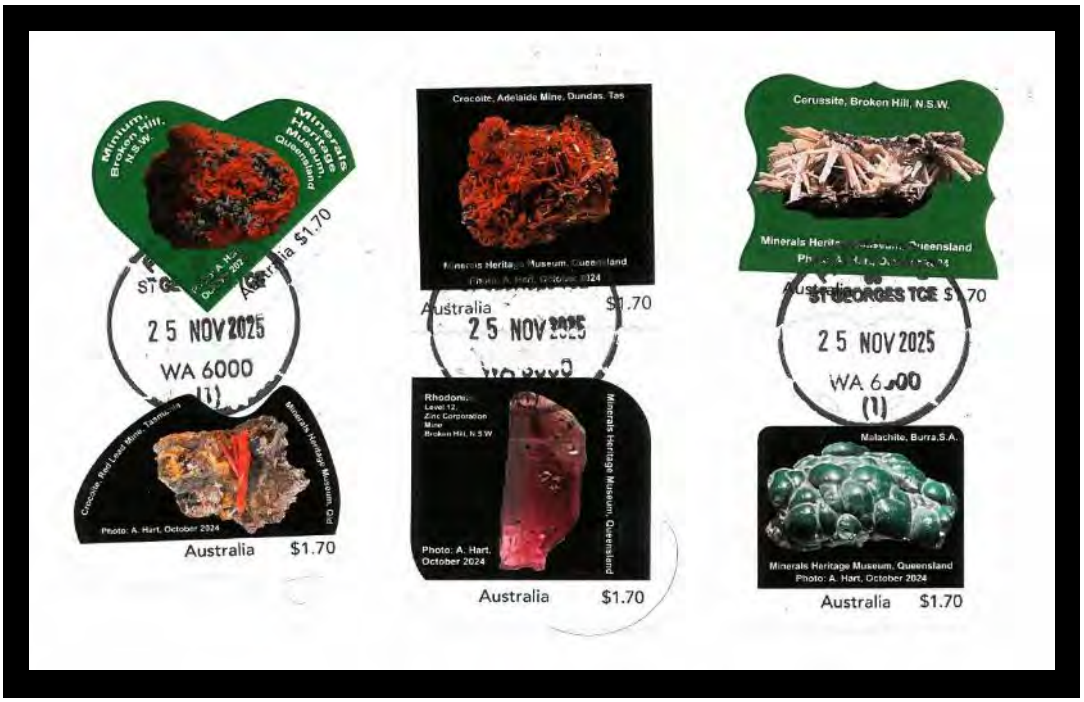
Compiled by Allan Hart

Since 2020, Australia Post has allowed customers to use their own photographs on postage stamps. This MyStamps product is ordered and paid for online.

A fee of $13 (above face value) per sheet of 20 stamps is charged for this privilege. A small discount is offered for buying multiple sheets of the same stamp. Once or twice per year, Australia Post offers a discount of up to $10 off per sheet (making the cost $3 above face value per sheet or 15c above face value per stamp), with no further discount for multiple sheets (unless you order more than 100 sheets).

Customers have 6 different shapes, and 9 values (standard letter rate, 3 large letter rates, and 5 international rates) to choose from, with the addition of the Christmas 65c value being available between September and December. The Australia Post website allows customers to zoom in and out of the photograph, and to move the photograph within the frame. I am willing to help any member wanting to place such orders. Australia Post will ask for proof of copyright ownership, or permission from the copyright owner to use the images.

The image below illustrates the six different shapes available. These photographs are of specimens at the Minerals Heritage Museum, Queensland, and were approved for use by the museum's curator, Tony Forsyth, before I placed my order. I am willing to exchange these covers (and mint stamps) for suitable items of exchange. If interested, please contact Allan at perth_mins@hotmail.com.



Welcome to new members

We have welcomed the following new members since December 2025:

Connor Barclay
David Barclay
Lyndal Money
Matthieu Cobby Gagnon
Dimitri Le Gaffric

This brings our membership to a total of 117.

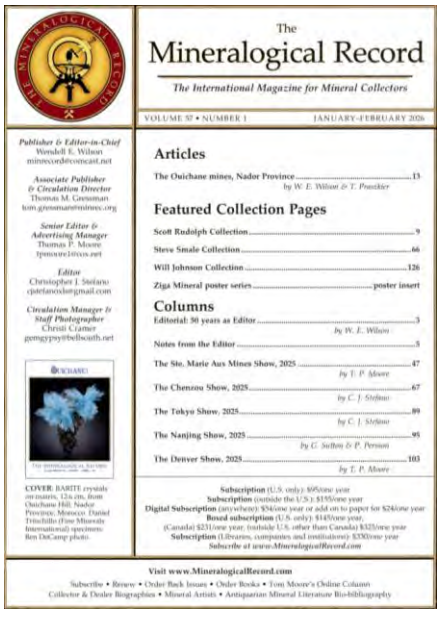
All members are asked to ensure that their contact details are up to date with the Membership Secretary/Secretary. If you change your email address or phone number, please let us know so that you continue to receive all MinSocWA communications – membership@minsocwa.org.au

New additions to MinSocWA's Library — ready to borrow

MinSocWA's library has just received the latest editions of:

- *Rocks&Minerals* — Jan–Feb 2026. Vol. 101, No. 1
- *Mineralogical Record — Ouichane!* Jan–Feb 2026. Vol. 57, No. 1
- *Australian Journal of Mineralogy — Pegmatites and granite-related minerals*, Dec 2025, Vol. 26, No. 2.

With the celebration of America's 250th anniversary, i.e. the bisesquicentennial of the United States Declaration of Independence, this *Rocks&Minerals* concentrates on the US flag colours of red, white and blue. Of course, many other countries, including Australia, New Zealand and the UK use these colours in their national flags, so I guess that we can celebrate as well.



The *Mineralogical Record* issue features the blue barite from the Ouichane Mines of northern Morocco. Other articles are detailed in the index, below.

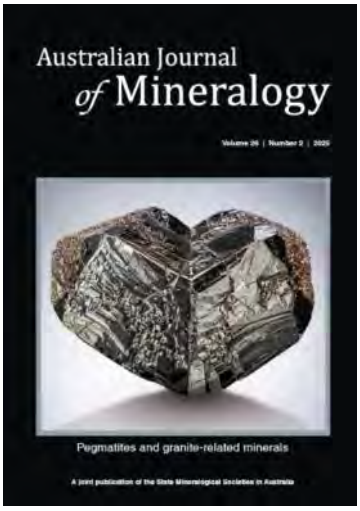
For the Australian Journal of Mineralogy issue, see next Newsletter item.

A more detailed account of these issues will be included in the April Bulletin. Please contact John Mill if you wish to borrow an item. The catalogue is available on our website.

AJM now available digitally

For those short of space or the younger, tech-savvy generation who wants everything at their fingertips, the AJM group is now able to offer a digital subscription to the Journal.

The digital version costs AU$32 for two issues, compared to a cost of $44 for two print issues. We are still in the process of fully configuring the website after the introduction of this important milestone, but please use the QR code below for instant access to the new subscription options.

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The latest issue is dedicated to *Pegmatites and granite-related minerals* — one of the most dynamic topics in contemporary mineralogy — and showcases a spectacular gallery of specimens from classic pegmatite localities in Western Australia and beyond.

Don't miss this milestone issue—your gateway to what's new and exciting in Australian mineralogy.

Upcoming events

COMMITTEE MEMBERS FOR 2025/2026

President	James Sherborne	president@minsocwa.org.au
Vice President	**Vacant**	
Secretary	Angela Riganti **(Acting)**	secretary@minsocwa.org.au
Treasurer	Vino Vigneswaran	treasurer@minsocwa.org.au
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Committee Member	Mike Wort	
Committee Member	Susan Stocklmayer	
Committee Member	Nicolas Hébert	
Committee Member	Renee Wee	
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Newsletter Editor	**Vacant**	newsletter@minsocwa.org.au
49th Joint Seminar	Murray Thompson	seminar@minsocwa.org.au
PGMS Secretary	Nicola Italiano	contact@perthgemmineralshow.com

Patron - *Mark Creasy*

MinSocWA meetings

Meetings of the Mineralogical Society of Western Australia Incorporated are usually held at **7.30 pm on the second Wednesday of every odd month**[1] at:

WA Lapidary & Rock Hunting Club rooms 31 Gladstone Road, Rivervale (corner of Newey Street)

The venue will be open from 6.30 pm for refreshments and socializing.

[1] Note the January meeting is usually the 3rd Wednesday.

MinSoc WA LINKS

Web	http://www.minsocwa.org.au
Facebook Group	https://www.facebook.com/groups/minsocwa
Facebook Page	https://www.facebook.com/MINSOCWA
Instagram	https://www.instagram.com/MINSOCWA
YouTube Channel	https://www.youtube.com/channel/UC0S2TFVFIBLU-2zlEzE5VNA

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