emc²

18–23 August 2024

4th european mineralogical conference • Dublin, Ireland

PROGRAMME AND ABSTRACTS

Mineralogical Society of the UK and Ireland

Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Copernicus Publications
The Innovative Open Access Publisher

European Journal of Mineralogy
Open Access

International Association on the Genesis of Ore Deposits
1964
IAGOD

iCRAG
SFI RESEARCH CENTRE IN APPLIED GEOSCIENCES

MSG

ESI Elemental Scientific

Environmental Mineralogy Group
EMG

Springer

MDPI
Academic Open Access Publishing
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ThermoFisher SCIENTIFIC

Society for Geology Applied to Mineral Deposits

GG

TELEDYNE PHOTON MACHINES

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1001
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TESCAN
PERFORMANCE IN NANOSPACE

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann
An Roinn Comhshaoil, Aeráide agus Cumarsáide
Department of the Environment, Climate and Communications

GEOMICROBIOLOGY NETWORK

AMG

Agilent
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OXFORD INSTRUMENTS

CMG
Est. 1947

EMU

International Mineralogical Association
IMA

CAMBRIDGE
UNIVERSITY PRESS & ASSESSMENT

Sociedad Española de Mineralogía
SEM

Société Française de Minéralogie et de Cristallographie
SFMC

Società Italiana di Mineralogia e Petrologia
SIMP

Mineralogical Society of the UK and Ireland

DMG
Deutsche Mineralogische Gesellschaft

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WELCOME

We are delighted to welcome all delegates, in-person and remote, to Dublin for this the fourth edition of the European Mineralogical Conference (EMC 2024). We hope that we can live up to the high standards set in Frankfurt, Rimini and Cracow.

Thanks to your enthusiasm and willingness to participate, we have a jam-packed programme for you to enjoy. We have sessions numbering up to 38, we have four plenary lectures and a public lecture to which all conference delegates are invited.

In addition, we have an ice-breaker reception and conference banquet to look forward to.

You should have received a copy of the 'Joining Instructions'. If not, it is available from the Conference Staff at registration/help desk. This should answer most if not all of the questions you may have. If it does not, please let conference staff/convenors know.

Our international team of volunteers will be identifiable by their t-shirts. They will be mostly responsible for running the hybrid aspect of our meeting ensuring that our remote participants have a rewarding conference experience.

From the perspective of the Mineralogical Society of the UK and Ireland, our President, Sally Gibson will be present at the conference to greet you. In addition, editors of two of our journals: Roger Mitchell (*Mineralogical Magazine*) and Jon Lloyd (*Geo-Bio Interfaces*) are also going to be in attendance. Make sure to say hello!

Finally, I encourage all delegates to visit the booths of our sponsors/exhibitors and engage with their representatives. Our conference could not run without their support and attendance.

Again, welcome to Baile Atha Cliath (Dublin). Tá súil againn go mbainfidh sibh taitneamh as do bhfuair gcuairt (we hope you enjoy your visit).

David Chew, Emma Tomlinson
Trinity College, Dublin

Russell Rajendra, Kevin Murphy
Mineralogical Society

Maciej Jaranowski
Polish Academy of Sciences, Kraków

Lecture Theatre 7 – Beckett		
Session 24. Volatiles and metals in volcanic systems: constraining their behaviour and processes between magma, gas emissions, and primary ore deposits		
Session chair: Michael Stock		
14.00-14.20	The effect of pressure on sulfur stability in silicate melts	Thomas, R.W. and Wood, B.J.
14.20-14.40	The effect of water on chlorine solubility in basalts	Rusiecka, Monika, K.* and Wood, B. J.
14.40-15.00	Speciation equilibria of H_2O, HCl, and NaCl in low-density magmatic-hydrothermal fluids	Salomone, F. and Dolejš, D.
15.00-15.20	The Volatility of Hg at Magmatic Temperatures	Boulliung, J., Wood, B.J. and Mather, T.A.
15.20-16.00	**BREAK**	
16.00–16.20	Decoding the H_2O degassing mechanism as a trigger for the explosive eruption of the Lower Laacher See phonolite	Marks, P.L. and Nowak, M.
16.20–16.40	On the paragenesis of quartz and native copper in the continental flood basalts of Western Volyn (Ukraine)	Batsevych, N.V., Naumko, I.M., Vovk, O.P., Beletska, Yu.A. and Triska, N.T. (REMOTE)

On the paragenesis of quartz and native copper in the continental flood basalts of Western Volyn (Ukraine)

Batsevych, N.V.[1], Naumko, I.M.[2], Vovk, O.P.[3], Beletska, Yu.A.[4], Triska, N.T.[5]

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The fundamental and applied significance of quartz in potentially copper-bearing volcanic rocks of the Ediacaran continental flood basalts of Western Volyn is determined by its consistent association with native copper. This characteristic paragenesis has been documented by us, following our predecessors, who, starting from work [1], pointed to the close connection of native copper with quartz and almost invariably observed the release of silica during its formation from hydrothermal solutions. Numerous researchers interpret these processes similarly, even today. Therefore, the purpose of our precise quartz investigations was to find the answer: where did such a large volume of hydrothermal solutions originate in order to evenly penetrate throughout the thicker layers of continental flood basalts in Western Volyn?

Quartz for research was extracted from geodes found in the basalts of the active Polytsi quarry, situated in the central region of the native outcrops of Western Volyn traps. The mineral occurs in the form of solid masses, grains, and growths. Druses and geodes are frequently encountered, with crystals ranging in size from a few mm to 1.5 centimeters along the main crystallographic axis. The color of quartz varies.

The crystal morphology of quartz is relatively simple. It exhibits basic forms such as the hexagonal prism m $\{10\bar{1}0\}$, along with two rhombohedra: the positive r $\{10\bar{1}1\}$ and the negative z $\{01\bar{1}1\}$. The faces of the rhombohedra are shiny and typically equally developed. The prisms are generally short in most sizes. The crystal habit ranges from hexagonal-dipyramidal to hexagonal-prismatic.

Thermobarogeochemical studies have identified families of fluid inclusions, predominantly composed of gas-liquid phases, including both essentially gaseous and essentially liquid inclusions, within the planes of healed cracks in quartz. Relatively high homogenization temperatures of up to 370°C have been determined, falling within the operational temperature range of mesothermal processes (200–300°C).

Chemical mass spectrometry data revealed a high content of H_2O, CO_2, and N_2 in the relict fluids present in the defects within the studied basalts. Considering the presence of granophyre injections with SiO_2 content ranging from 63.72 to 77 wt.%, the question arises: how did such a significant amount of hydrothermal fluids penetrate the basalts to form quartz and uniformly alter the entire thickness of the trap formation? Water plays a pivotal role in the genesis, differentiation, ascent, and eventual eruption of magma. Previous research [3] has focused on the evolution of H_2O and CO_2 saturation conditions for residual melt within the magmatic system crystallizing at 0.7 GPa. During crystallization, the maximum solubility of water gradually increases from ~10.2 to ~12.0 wt.%, while the solubility of CO_2 decreases from ~0.53 to ~0.36 wt.%. These findings suggest that the formation of quartz occurred as a result of fluid-liquefaction interaction [2] during the final stages of the evolution of a single magmatic process, following the separation of residual solutions enriched with silicic acid and saturated with water.

References:

[1] Lazarenko Ye et al. (1960) Mineralogy of Igneous Complexes of Western Volyn: 510
[2] Naumko I et al. (2016) Rep of the NASU 9: 69–78. DOI: https: //dx.doi.org// 10.15407/dopovidi2016.09.069.
[3] Petrelli M et al. (2018) Nature Communications 9 (1): 770. doi:10.1038/s41467-018-02987-6.