

emc² 20

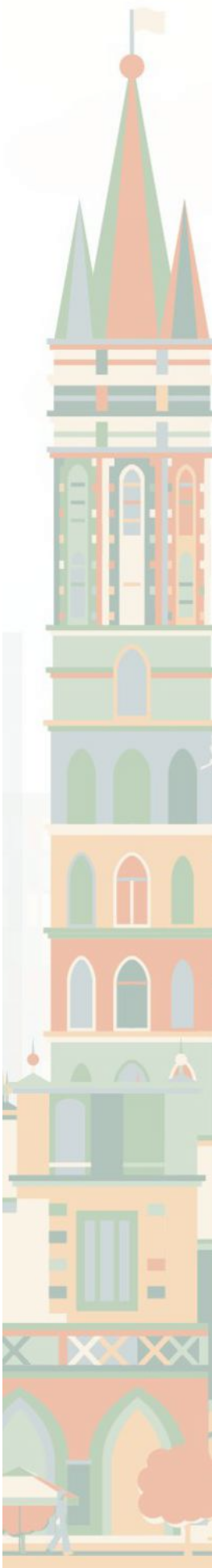
3rd European Mineralogical Conference Cracow Poland

Mineralogy in the modern world

ABSTRACT BOOK

29 August - 2 September 2021





PROGRAMME

oral blocks

	STAGE 1 (Main Stage)	STAGE 2	STAGE 3	STAGE 4
Monday 30th Aug 2021 9:30 – 11:15 11:30 – 13:00 15:00 – 17:15	T1_S2	T5_S3+T11_S1 T3_S1	T2_S1	T8_S1+T8_S2
Tuesday 31st Aug 2021 9:30 -11:15 11:30 – 13:00 15:00 – 17:15	T1_S2 T1_S3+ T1_S4	T10_S2+T10_S3+T10_S4 +T10_S5 T6_S1	T5_S1+T7_S1 T4_S1	T10_S1 T12_S1
Wednesday 1st Sept 2021 9:30 -11:15 11:30 – 13:00 15:00 – 17:15	T1_S5 T1_S1	T13_S1+T15_S1 T14_S2	T5_S2 T12_S2+T12_S3 +T12_S4	T11_S2
Thursday 2nd Sept 2021 9:30 -11:15 11:30 – 13:00	T9_S1+T9_S2	T14-S1+T16_S1	T5_S4	T11_S3+T11_S4

Mineralogy in the modern world

Following the success of the 1st and 2nd European Mineralogical Conference, the emc2020 will be focused on current and future challenges in the Earth, planetary and environmental sciences, and fostering an exchange of new views and research results between scientists from Europe and beyond.

The city of Kraków is a vibrant, academic and tourist city in the heart of Europe. Modern infrastructure, efficient public transportation and famous Polish hospitality make it a safe and friendly place for visitors from all over the world. The city dates back to Middle Ages and has traditionally been one of the leading centers of Polish and European academic, cultural, and artistic life. It was the capital of Poland from 1038 to 1569.

Welcome in Cracow!

Krakau, ክራካው, Cracow, ^{Cracovia}, Кракoв, 克拉科夫, Cracó, Kraká, クラクフ, كراكوف, Cracovie, Krakov, Кракiв, Cra-cóp, Krakovja

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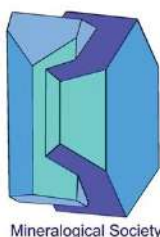


The **EMC2020** is organized by the **PTMin (Mineralogical Society of Poland)** on behalf of other European mineralogical societies:

- DMG – Deutsche Mineralogische Gesellschaft**
- MinSoc – Mineralogical Society of Great Britain & Ireland**
- MinSocFin – Mineralogical Society of Finland**
- ÖMG – Österreichische Mineralogische Gesellschaft**
- RMS – Russian Mineralogical Society**
- SEM – Sociedad Española de Mineralogía**
- SFMC – Société Française de Minéralogie et de Cristallographie**
- SIMP – Societa' Italiana di Mineralogia e Petrologia**
- SSMP – Swiss Society of Mineralogy and Petrology**

with participation of:

- EMU – European Mineralogical Union**
- ING PAN – Institute of Geological Sciences, Polish Academy of Sciences**
- Geo8 – GFZ German Research Centre for Geosciences**





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PLENNARY LECTURES

2020

Plenary Lecture

THE EFFECT OF PRESSURE ON OPEN-FRAMEWORK SILICATES: ELASTIC BEHAVIOUR AND CRYSTAL-FLUID INTERACTION

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The physical behavior of microporous materials (*i.e.*, materials with structural voids ≤ 2 nm) compressed in a fluid is strongly affected by the potential crystal-fluid interaction, with a penetration of new molecular species through the structural cavities in response to the applied pressure.

Recent experimental findings and computational modeling show that, when no crystal-fluid interaction occurs, the effects of pressure are mainly accommodated by tilting of the (quasi-rigid) tetrahedra, around the bridging oxygen atoms that act as hinges. Tilting of tetrahedra is the dominant mechanism at low-mid *P*-regime, followed by distortion and compression of polyhedra which become dominant at the mid-high *P*-regime. The mechanisms of deformation, accommodating the bulk compression, are governed by the topology of the tetrahedral framework. One of the most common deformation mechanisms in zeolitic frameworks is the increase of channels ellipticity. However, the compressibility of the cavities (in the form of channels or cages) is governed by the ionic and molecular extra-framework content, with different unit-cell volume compressibility in isotopic structures.

Only a few zeolites experience a *P*-induced intrusion of new monoatomic species or molecules from the *P*-transmitting fluids. Natural zeolites, in particular, have well-stuffed channels at room conditions, which tend to hinder the penetration of new species through the structural cavities. A comparative analysis of experimental findings allow us to provide an overview of the intrusion phenomena, which are diverse for monoatomic species (*e.g.*, He, Ar, Kr), small (*e.g.*, H₂O, CO₂) or complex molecules, along with the recently observed *P*-induced polymerization phenomena (*e.g.*, C₂H₂, C₂H₄, C₂H₆O, C₂H₆O₂, BNH₆, electrolytic MgCl₂·21H₂O solution), with potential technological and geological implications. Several variables control the sorption phenomena at high pressure: the “free diameters” of the framework cavities, nature and bonding configuration of the extra-framework population, the kinetic diameter of the potentially penetrating molecules, the partial pressure of the penetrating molecule in the fluid (if mixed with other non-penetrating molecules), the rate of *P*-increase, the surface/volume ratio of the crystallites under investigations, and the temperature at which the experiment is conducted.