International Mineralogical Association

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2025 MEDAL OF EXCELLENCE IN MINERALOGICAL SCIENCES TO DR. BJORN O. MYSEN

The International Mineralogical Association (IMA) is honoured to present its 2025 Medal of Excellence in Mineralogical Sciences to Dr. Bjorn O. Mysen of the Carnegie Institution for Science, USA. A world-leading figure in experimental petrology and geochemistry, Dr. Mysen has made transformative contributions that fundamentally advanced our understanding of silicate melts, magmatic systems, and the role of volatiles in the Earth's interior. His pioneering work combining high-temperature experimental petrology with in-situ spectroscopy revolutionized how scientists investigate melt structure under geologically relevant conditions, establishing conceptual frameworks that have become foundational throughout mineralogy and geochemistry.

Over more than five decades, Dr. Mysen has shaped modern views of magmatic processes by demonstrating the key role of melt structure in governing the thermodynamic behaviour of geological materials. Among his earliest and most influential contributions was the discovery that the degree of melt polymerization and the abundance of non-bridging oxygen exert strong control on rare-earth and trace-element partitioning between crystals, melts, and fluids. This insight provided a mechanistic basis for interpreting geochemical signatures in igneous rocks and remains one of the most widely applied principles in petrology today. His research into the behaviour of volatiles, particularly water and carbon dioxide, revealed how speciation and solubility are linked to melt composition, pressure, temperature, and redox conditions. These discoveries fundamentally reshaped models of mantle melting, magma storage, and volcanic degassing, influencing subjects ranging from global geochemical cycles to the evolution of planetary interiors.

Dr. Mysen completed his BSc and MA degrees at the University of Oslo, Norway (1969 and 1971), followed by a PhD in geochemistry from Pennsylvania State University, USA (1974). He joined the Geophysical Laboratory of the Carnegie Institution for Science in 1972, beginning a distinguished association that would span more than 50 years. He advanced to Senior Staff Scientist and later Senior Scientist of the Carnegie Institution. Even after his formal retirement in 2023, he continues to be an active Emeritus Scientist, contributing to ongoing research and advising programs internationally. Dr. Mysen has held visiting and collaborative positions around the world, including at the Bayerisches Geoinstitut (Germany), the Institut de Physique du Globe de Paris (France), and Tohoku University (Japan), reflecting his stature as a global leader in the field and his commitment to international scientific collaboration.

A defining aspect of Dr. Mysen's career is his unparalleled ability to integrate experimental innovation with conceptual clarity. He was among the first to apply Raman and infrared spectroscopy to silicate melts and glasses at high temperature and pressure, enabling real-time observation of structural changes in molten silicates and their interaction with volatiles. His experimental developments provided the tools necessary to investigate melt behaviour at conditions typical of Earth's upper mantle and deep crust—work that has profoundly influenced research methodologies worldwide. From clarifying the thermodynamic basis for mantle melting to establishing quantitative relationships between melt speciation and physical properties, his scientific achievements continue to shape the theoretical and experimental foundations of mineralogical sciences.

Dr. Mysen is the author of around 300 peer-reviewed publications and seven highly influential books, including *Silicate Glasses and Melts* (with P. Richet), which remains an essential reference for researchers studying melt structure and dynamics. His extensive publication record has been cited more than 23,000 times, reflecting the broad and lasting impact of his discoveries across geoscience disciplines. His exceptional scientific reputation is further evidenced by an h-index greater than 80, a testament to his sustained influence and scholarly excellence. His work continues to be cited extensively by researchers in mineralogy, geochemistry, volcanology, and materials science.

In addition to his scientific production, Dr. Mysen has provided outstanding service to the global mineralogical community. He has served as Associate Editor of *American Mineralogist* and *Geochimica et Cosmochimica Acta*, and as Editor of *Phase Diagrams for Ceramists*, demonstrating a long-standing commitment to strengthening scientific publishing and supporting rigorous standards of scholarship. He has participated actively in scientific advisory committees, evaluation panels, and international working groups, contributing significantly to the advancement of research infrastructure and collaborative networks. His strategic leadership has helped shape research priorities for experimental facilities and interdisciplinary initiatives.

His commitment to mentoring young scientists has shaped the careers of multiple generations of researchers, many of whom now hold prominent academic and research positions worldwide. Known for his generosity with time and expertise, he has fostered scientific exchange across national, disciplinary, and methodological boundaries. His legacy extends well beyond individual discoveries to include the development of a vibrant community of researchers inspired by his creativity, clarity of thought, and scientific integrity.

Dr. Mysen's remarkable record of achievement has been recognized through numerous prestigious honours throughout his career, underscoring the international significance of his contributions. His colleagues consistently describe him as a visionary researcher, a rigorous experimentalist, an inspiring mentor, and an exemplary citizen of the scientific community—qualities that make him a highly deserving recipient of this distinguished recognition.

The IMA is proud to recognize Dr. Bjorn O. Mysen as a scientist whose contributions have profoundly advanced mineralogical sciences, whose influence continues to shape Earth and planetary research, and whose dedication has strengthened the global scientific community.

We extend our warmest congratulations to Dr. Mysen on receiving the 2025 Medal of Excellence in Mineralogical Sciences, and we look forward to his medalist lecture at the 24th General Meeting of the IMA in Nanjing, China, August 20–24, 2026.