

IMA Working Group Nano-Mineralogy (WG-NM) Annual Report 2025

Submitted by: Juan Liu, Chairman of WG-NM

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Building on the foundation laid in our inaugural years, 2025 has been a year of vibrant academic exchange, interdisciplinary collaboration, and impactful initiatives. Our working group remains committed to advancing the frontier of nano-mineralogy by fostering global cooperation, promoting cutting-edge research, and bridging diverse scientific fields. With the continued dedication of our board, members, and partners, we have made significant strides in expanding the reach and influence of nano-mineralogy research worldwide.

1. Key Activities in 2024-2025

1.1 Frontiers of Nano-Mineralogy Forum (Guangzhou, China)

WG-NM successfully co-organized the **Frontiers of Nano-Mineralogy Forum** held in Guangzhou, China, on November 2–3, 2024. This flagship event brought together nearly 40 distinguished professors and researchers from different countries, including keynote speakers such as Prof. Michael F. Hochella, Jr. (Virginia Tech, USA), Prof. Yoshio Takahashi (The University of Tokyo, Japan), Dr. Hongping He (Member of the Chinese Academy of Sciences, Guangzhou Institute of Geochemistry), and Prof. Hailiang Dong (China University of Geosciences, Beijing, China).

WG-NM committee members actively participated in organizing and leading the forum, with Prof. Juan Liu (Peking University, China) and Prof. Yi Yang (East China Normal University, China) playing key coordinating roles. The academic program covered diverse themes central to nano-mineralogy, including nanomineral properties, transformation mechanisms, interfacial processes, and environmental applications. A highlight of the forum was Prof. Michael F. Hochella, Jr.'s presentation titled *“Potential use of engineered nanoparticles in ocean fertilization for large-scale atmospheric carbon dioxide removal”*, which provided critical insights into the current status and future prospects of nanomineral applications in ocean iron fertilization.



This forum facilitated in-depth academic exchanges among scholars and experts in the field, strengthening existing collaborations and laying the groundwork for new interdisciplinary partnerships.

1.2 Special Session at The 61st Clay Minerals Society Meeting (Hawaii, USA)

Following the ongoing activity outlined in our 2023 report, WG-NM Chairman Juan Liu collaborated with Prof. Eric Roden and Prof. Jin-wook Kim to organize a special session on “**Interactions between nanominerals and microbes**” at The 61st Clay Minerals Society Meeting—a joint event with the Asian Clay and Clay Minerals Society—held in Hawaii, USA, in July 2024. The session focused on the dynamic interplay between nanominerals and microbial communities, a topic of growing importance in geomicrobiology and environmental science. It attracted diverse contributions from researchers worldwide, fostering cross-disciplinary dialogue on biogeochemical processes mediated by nanomineral-microbe interactions.

1.3 Special Session at The 3rd International Association of GeoChemistry (IAGC) Conference (Italy)

In June 2025, WG-NM Chairman Juan Liu partnered with Dr. Kevin Rosso and

Prof. Keisuke Fukushi (WG-NM Vice Chair) to organize a special session titled **“Nanoparticles as drivers of biogeochemical behavior”** at The 3rd International Association of GeoChemistry (IAGC) Conference in Italy. This session highlighted the pivotal role of nanoparticles in regulating biogeochemical cycles, nutrient transport, and contaminant remediation in Earth systems. The session featured high-quality research presentations and lively discussions, further solidifying WG-NM’s role as a leader in promoting nano-mineralogy research within the global geochemistry community.

2. Future Plans for 2026

2.1 Support for IMA Annual Meeting (Nanjing, China)

WG-NM will actively support the organization of the 2026 IMA Annual Meeting to be held in Nanjing, China. We have submitted a session proposal titled **“Nanoscale Mineral–Organic Interactions in Biogeochemical Processes”**, which aims to explore the complex interactions between nanoscale minerals and organic matter and their implications for biogeochemical cycling, carbon sequestration, and environmental sustainability. This session will bring together researchers from mineralogy, geochemistry, biology, and environmental science to advance our understanding of nanoscale processes in Earth systems.

2.2 Editorial and Outreach Initiatives

Building on our previous success with special issues (e.g., *Mineralogical Magazine* 2022–2023), WG-NM will continue to explore opportunities to publish review papers and special issues in prestigious journals. We will also strengthen our outreach efforts to promote nano-mineralogy to a broader audience, including early-career researchers and students, through workshops, webinars, and collaborative educational programs.

2.3 Interdisciplinary Collaboration Promotion

WG-NM will actively foster further interdisciplinary collaboration by initiating partnerships with other IMA working groups, international scientific societies, and industry partners. We aim to organize joint workshops and research consortia focused on emerging topics such as nanomineral-based functional materials, nanomineral environmental applications, and human health impacts of nanominerals.