

Kyoto University On-site Laboratory: Laboratory for Green Porous Materials

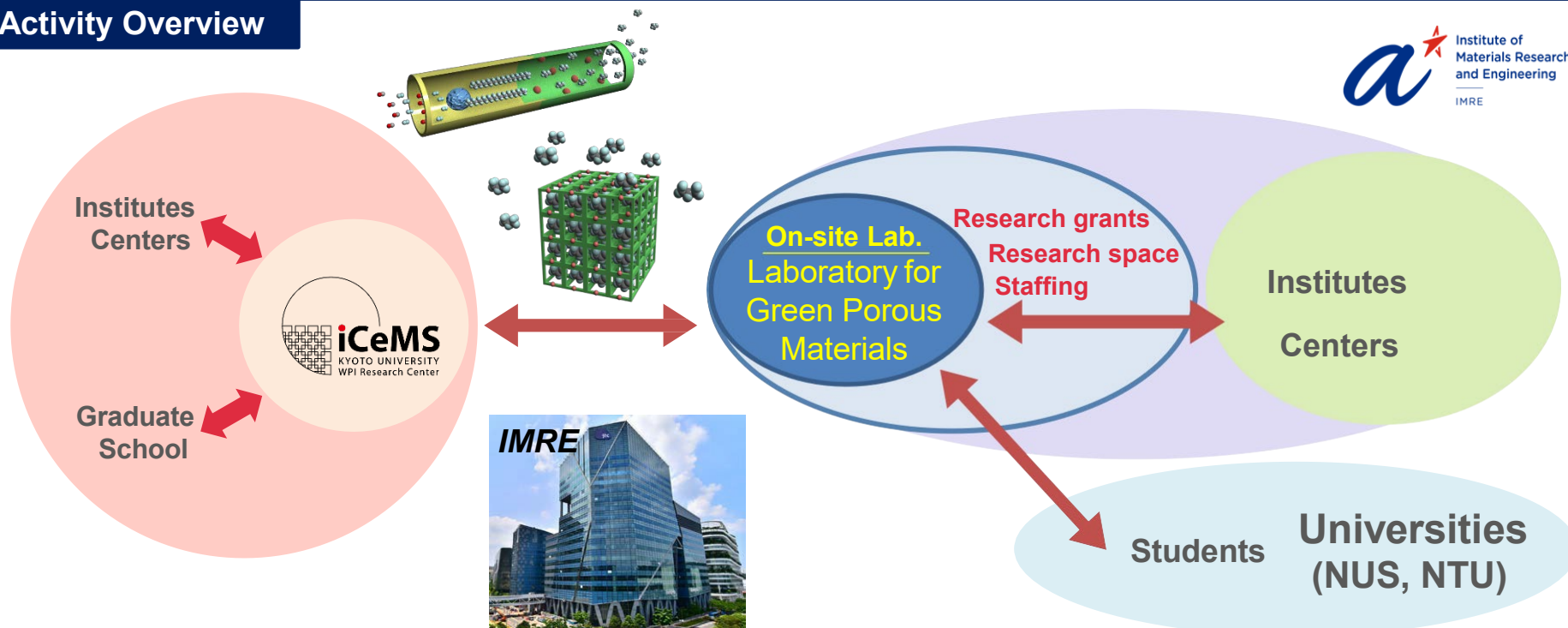
General Information

- ◆ Approved in FY 2020
- ◆ Established in FY 2020
- ◆ Established by the Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University Institute for Advanced Study (KUIAS)
- ◆ Partner institution: The Institute of Materials Research and Engineering (IMRE), Agency for Science, Technology and Research (A*STAR), Singapore
- ◆ Purposes: Combining iCeMS's expertise in porous materials with IMRE's research on bioapplications and green catalysts to pioneer an environmentally beneficial research
- ◆ Location: IMRE, Singapore (outbound)
- ◆ Functions:
 - Environmental catalysis with porous materials, creating new fields for environmental impact, and advancing interdisciplinary research.
 - Development of hybrid porous materials and biocompatible polymers for medical and healthcare applications.

Positive ripple effects to the university's activities

- Serves as Kyoto University's point of contact at A*Star in Singapore.
 - Acts as a bridge between Kyoto University and Singaporean universities and research institutes in material science research.
 - Kyoto University early-career researchers and students are motivated by international students.
 - Helps Kyoto university students develop international awareness.
- Expansion and development of joint research topics between KUIAS and IMRE.
 - Research guidance for talented students at the National University of Singapore, etc.
 - Exchange between Kyoto University researchers and local researchers and students through holding seminars.
 - Exploring the potential of porous materials development in cooperation with local companies.

Activity Overview



Main activities in FY 2025

① Collaborative research on green porous materials

• In 2025, research were conducted under the following themes :

Theme 1: MOF catalysts for sustainable applications

Theme 2: MOF-mixed matrix membranes

Theme 3: MOF defect engineering

Theme 4: MOF/biocompatible polymer hybrids

- Assoc. Prof. Ken-ichi Otake stayed in Singapore during the following periods, participating in conferences, delivering lectures, and conducting OSL visits and research discussions:(July 2–10, 2025; December 7–11, 2025; March 5–7, 2026)
- Professor Susumu Kitagawa (Distinguished Professor) delivered a keynote lecture at the A*STAR-organized event “In Conversation with Prof. Susumu Kitagawa and Prof. Max Welling on AI and Materials Discovery” (March 5, 2026).
- A joint proposal to the NRF “AI for Science (AI4S)” program with Kyoto University and Nanyang Technological University (NTU) was accepted, with this OSL as a participating member. Collaborative research will begin in FY2026.
- Collaborative research outcomes related to Themes 1 and 3 were compiled and reported through the co-authorship papers:
“MOF Catalysts for Plastic Depolymerization,” *Angew. Chem. Int. Ed.*, 64, e202504017 (2025)
“Aqueous Upcycling of Polyethylene Furanoate from Mixed Plastic Feeds into Metal-Organic Frameworks,”
Angew. Chem. Int. Ed., Just Accepted (2026)

② OSL symposium

- On March 6, 2026, a joint symposium with VISTEC OSL was held at NTU, with approximately 60 participants, including 10 faculty members (including Prof. Kitagawa, Prof. Satoshi Horike, and Associate Prof. Otake), from Kyoto University and researchers from IMRE, VISTEC, and NTU.
- The symposium featured presentations on advanced materials (AI, catalysis, porous materials, CO₂ utilization), along with updates on NRF funding trends and JST Singapore collaborative programs.
- Discussions were also held on future collaborative projects among IMRE, VISTEC, Kyoto University, and NTU.

Research collaboration with
the IMRE / A*Star OSL

On-site laboratory researchers (concurrent posts)

Assistant Professor Jason Lim
Assistant Professor Shermin Goh
Dr. Tristan Tan

