

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

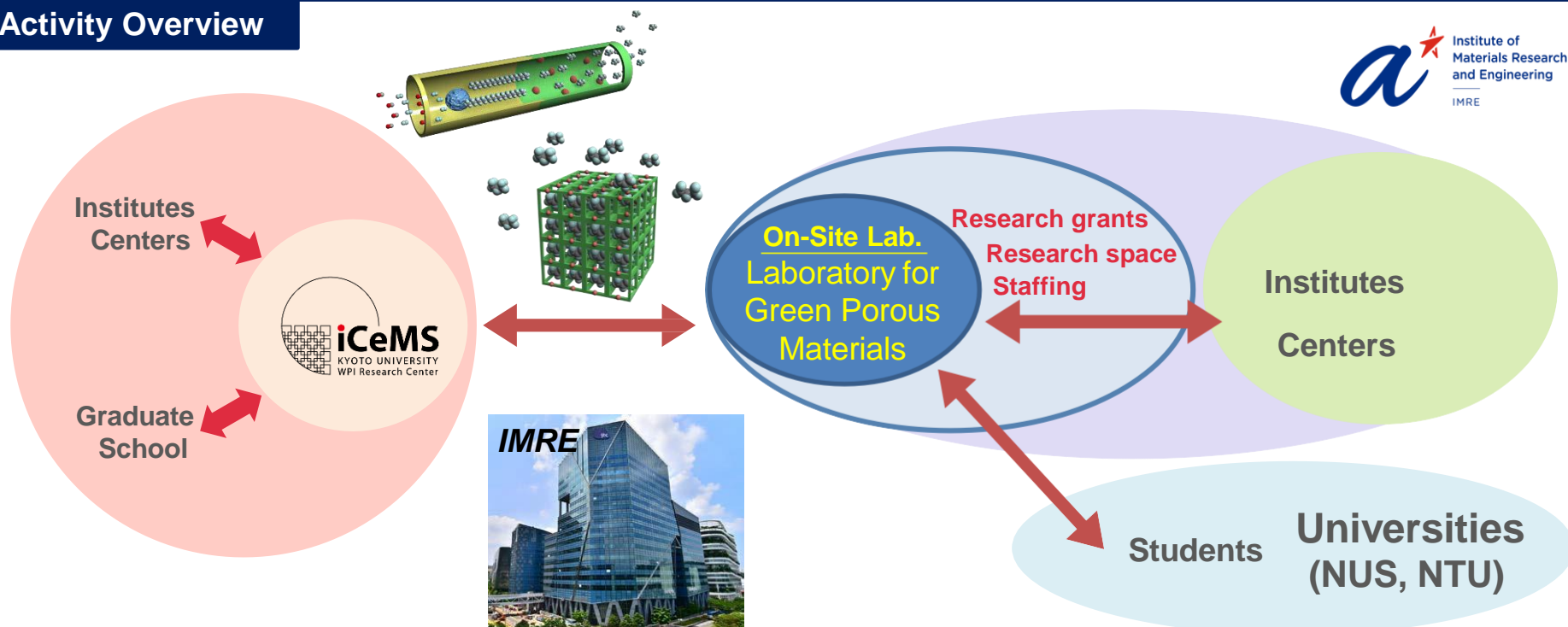
General Information

- ◆ 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 2024

① Collaborative research on green porous materials

• In 2024, the following research themes were conducted:

- 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 to participate in local academic conferences, give lectures at universities in Singapore, and conduct research discussions at OSL: July 14–23, 2024; December 5–13, 2024; and March 9–12, 2025.

• Dr. Tristan Tan from OSL was invited to iCeMS, where he gave a lecture, engaged in research discussions with iCeMS researchers, and visited Nanoterasu, one of Japan's leading synchrotron radiation facilities (February 18–25, 2025).

• **The collaborative research results from Theme 1 were published.**

“Pyrolytic Depolymerization of Polyolefins Catalyzed by Zirconium-based UiO-66 Metal-Organic Frameworks”, Jerry Zhi Xiong Heng, Tristan Tsai Yuan Tan, Xin Li, Wei Wei Loh, Yuting Chen, Zhenxiang Xing, Zhiyan Lim, Jennet Li Ying Ong, Katherine Shiyun Lin, Yusuke Nishiyama, Takefumi Yoshida, Lili Zhang, Ken-ichi Otake, Susumu Kitagawa, Xian Jun Loh, Enyi Ye, Jason Y.C. Lim, *Angew. Chem. Int. Ed.*, 63, e202408718, 2024

② OSL symposium

On February 11, 2025, a joint symposium with VISTEC OSL was held at Kasetsart University in Thailand. From Kyoto University, six faculty members, including Distinguished Prof. Kitagawa and Assoc. Prof. Otake. Approximately 50 faculty members and students from IMRE, VISTEC, both OSLs, and the host institution, Kasetsart University, also attended. The symposium focused on sharing the latest research findings on new materials, including catalysts, porous materials, and CO₂ utilization. Additionally, a local Program Management Unit (PMU) representative provided insights into Thailand's academic funding landscape, and discussions were held on potential collaborative research projects among IMRE, VISTEC, and Kyoto University.

Research collaboration with
the IMRE / Soft Materials Laboratory

**Onsite laboratory researchers
(concurrent posts)**

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

