

**Establishment of the Advanced Collaborative Research Laboratory for Carbon
Neutrality at Kyoto University**
To promote research on solid oxide energy conversion technology
(electrolysis/fuel cell)
and other basic research for methanation

March 15, 2023
Kyoto University
Osaka Gas Co., Ltd.

Kyoto University (Kyoto City, Kyoto Prefecture; President: Nagahiro Minato) and Osaka Gas Co., Ltd. (Osaka City, Osaka Prefecture; Representative Director and President: Masataka Fujiwara; hereinafter “Osaka Gas”) will establish a collaborative research laboratory, the Advanced Collaborative Research Laboratory for Carbon Neutrality (hereafter, “the collaborative research laboratory”), in April 2023 on Kyoto University’s Katsura Campus, as a base for industry-academia collaborative research, to conduct basic research, including that on methanation technology for achieving carbon neutrality by 2050.

This is the first project in which Kyoto University and Osaka Gas will set up a collaborative research laboratory.¹

Kyoto University and Osaka Gas have been promoting various activities under a comprehensive collaboration agreement² on carbon neutrality concluded in fiscal 2021. The collaborative research laboratory will be established as an initiative to further strengthen the collaboration.

Osaka Gas has been working on the technology development and commercialization of the household fuel cell system Ene-Farm (SOFC³) for some time. In recent years, the company has also been engaged in research on SOEC⁴ methanation technology, which is a highly efficient, innovative methanation technology anticipated as a promising solution to city gas decarbonization, by applying its technical expertise built through the development of SOFC technology.

Kyoto University has made outstanding achievements in the basic research field of solid oxide energy conversion technology used in SOECs and SOFCs.

For five years from April 2023, both parties will jointly operate the collaborative research laboratory to conduct basic research for improving the durability and reliability of SOECs/SOFCs and cell stacks,⁵ as well as exploratory basic research on carbon neutrality. In addition, they will promote research that will facilitate the development of young researchers.

The collaborative research laboratory will be established at the Office of Society-Academia Collaboration in concert with the Open Innovation Institute. The initial members will be three faculty members, including a Program-Specific Professor, and they will collaborate with faculty members of Kyoto University’s Graduate School of Human and Environmental Studies and Graduate School of Engineering to jointly promote research. The research will be conducted at the ROHM Plaza on the Katsura Campus of Kyoto University.

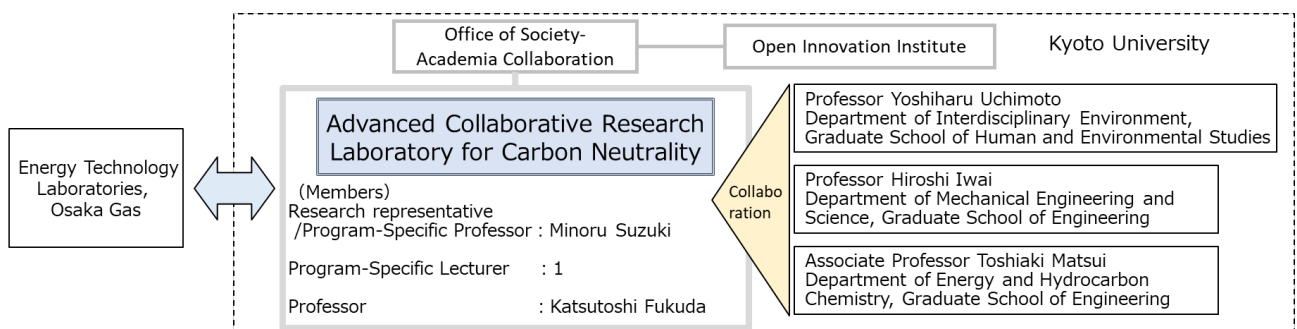
Kyoto University and Osaka Gas will promote initiatives through collaboration to achieve carbon neutrality by 2050.

1. At Kyoto University, an industry-academia collaborative organization established within a graduate school is referred to as an industry-academia collaborative course. If it is established within an institute or other facility, it will be referred to as an industry-academia collaborative laboratory.
2. The agreement was announced on March 22, 2022 in the article “Announcement Concerning Conclusion of a Comprehensive Collaboration Agreement on Carbon Neutrality—Enhancing comprehensive collaboration between Kyoto University and Osaka Gas to achieve carbon neutrality.”
(https://www.osakagas.co.jp/en/whatsnew/___icsFiles/afiedfile/2022/03/29/220322_1.pdf)
3. A solid oxide fuel cell (SOFC) is a device that can generate electricity and water vapor from hydrogen and oxygen.
4. A solid oxide electrolysis cell (SOEC) is an element that can electrolyze water vapor and CO2 at high temperatures using a solid oxide. The cell performs the reverse reaction of that of SOFCs.
5. A cell stack is a structure consisting of multiple layers of plate-like cells.

1. Overview of the Collaborative Research Laboratory

Name	Advanced Collaborative Research Laboratory for Carbon Neutrality
Research location	ROHM Plaza, Kyoto University Katsura Campus
Project period	April 2023 to March 2028 * The project may continue if promising results are in sight.
Research description	(1) Basic research to improve the durability and reliability of SOECs, SOFCs, and cell stacks (2) Exploratory basic research on carbon neutrality
Research representative	Program-Specific Professor Minoru Suzuki (seconded from Osaka Gas)
Collaborative faculty	Professor Yoshiharu Uchimoto (Graduate School of Human and Environmental Studies) Professor Hiroshi Iwai (Graduate School of Engineering) Associate Professor Toshiaki Matsui (Graduate School of Engineering)

2. Rendered Image of the Collaborative Research Laboratory



3. Major Results of Comprehensive Collaboration for Achieving Carbon Neutrality

(1) Collaborative research

- Currently, 14 collaborative research projects are under way, including biomethanation; analysis and control of combustion of hydrogen and ammonia; evaluation of the durability of SOFCs, SOECs and their materials, and basic research on their deterioration mechanisms; and atmospheric CO₂ concentration technology.

(2) Financial assistance for young Kyoto University researchers provided by Osaka Gas

- Financial assistance was provided to support research projects initiated by young researchers at Kyoto University that contribute to realizing a carbon neutral society.
- In fiscal 2022, resolutions to provide one individual-researcher grant and three research-team grants were adopted.

(3) Symposia on carbon neutrality

- The first symposium was held in December 2021 on the theme of “A Challenge to Achieve Carbon Neutrality by 2050.”
- The second symposium was held in December 2022 on the theme of “A Path to Achieve Carbon Neutrality by 2050.”