京都大学
KYOTO UNIVERSITY

SUMITOMO METAL MINING

July 1, 2022

Press Release

Kyoto University
Sumitomo Metal Mining Co., Ltd.

“Sumitomo Metal Mining Industry-Academia Joint Course for the Effective Use of Carbon Dioxide” Established at Kyoto University: Research and Development of a Photocatalyst for CO_2 Reduction to Achieve Carbon Neutrality

Kyoto University and Sumitomo Metal Mining Co., Ltd., or SMM, in R&D collaboration since 2019 on a CO_2 reduction photocatalyst, established the “Sumitomo Metal Mining Industry-Academia Joint Course for the Effective Use of Carbon Dioxide” on June 1, 2022 at the KyotoU Katsura Campus with a view to accelerating their joint effort. This industry-academia joint course, commencing in earnest this month with the appointment today of Program-Specific Senior Lecturer Shoji Iguchi as one of its instructors, is run by Catalysis Chemistry Laboratory (faculty: Prof. Tsunehiro Tanaka and Prof. Kentaro Teramura, hereinafter “T. Tanaka & Teramura Lab”) of Applied Reaction Chemistry Chair in the Department of Molecular Engineering at Kyoto University Graduate School of Engineering and SMM.

Kyoto University and SMM's CO_2 reduction photocatalyst is an artificial photosynthesis technology that converts carbon dioxide into industrially useful carbon monoxide, which can serve as a raw material for plastics. It is anticipated that this technology will help not only reduce CO_2 emissions but also ease dependence on fossil fuels by making the substance recyclable, potentially contributing to Japan's goal of achieving carbon neutrality and realizing a decarbonized society by 2050.

A key component of artificial photosynthesis is photocatalyst technology, which is required for increasing energy conversion efficiency. T. Tanaka & Teramura Lab, a world leader in photocatalytic synthesis and photocatalytic reaction mechanism analysis, has been applying their technologies to build a next-generation photocatalytic chemical system that can help reduce environmental impacts and realize a circular economy. SMM, on its part, has for many years been conducting basic research into powder materials that can express new functions and into innovative powder synthesis technologies. The company has also been actively pursuing photocatalysis research, focusing on improving catalyst performance with the use of its metal nanoparticle synthesis technology.

The course, established for joint research by Kyoto University (T. Tanaka & Teramura Lab) and SMM, enables the Program-Specific Senior Lecturer and other participants to work together on the project in the University's unique research environment.

With their joint course now underway, Kyoto University and SMM aim to continuously integrate their technologies in a wide range of fields related to CO_2 utilization, develop new high-performance photocatalytic materials based on an expanded range of research ideas, and foster human capital in the photocatalysis field.

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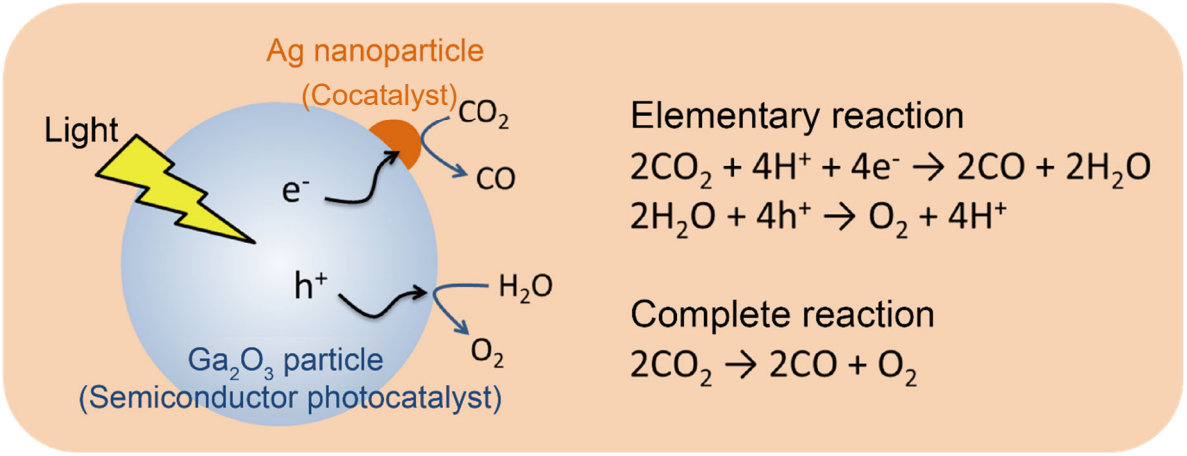
Course overview

- Title: Sumitomo Metal Mining Industry-Academia Joint Course for the Effective Use of Carbon Dioxide
- Participating faculty:
  Professor Tsunehiro Tanaka, Graduate School of Engineering, Kyoto University
  Professor Kentaro Teramura, Graduate School of Engineering, Kyoto University
  Program-Specific Senior Lecturer Shoji Iguchi, Graduate School of Engineering, Kyoto University
  The project team also includes SMM researchers.
- Period: June 2022 to March 2027 (4 years and 10 months)

Mechanism of CO_2 reduction by photocatalyst



Close-up of an Ag nanoparticle-loaded semiconductor photocatalyst particle