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Osaka University
Kawasaki Heavy Industries, Ltd.
Mitsui Chemicals, Inc.

Osaka University, Kawasaki Heavy Industries and Mitsui Chemicals Successfully Synthesize Methanol and Para-xylene From CO_2

Osaka University's (Suita, Osaka; President: NISHIO Shojiro) Graduate School of Engineering Science, Kawasaki Heavy Industries, Ltd. (Tokyo: 7012; President: HASHIMOTO Yasuhiko) and Mitsui Chemicals, Inc. (Tokyo: 4183; President & CEO: HASHIMOTO Osamu) today announced that they have successfully conducted demonstration tests of methanol and para-xylene synthesis using CO_2 as a feedstock. The tests were conducted as part of the Research of Selective Synthesis Technology of Chemical Products for Carbon Recycling project (hereinafter "this project"), which has been selected for inclusion in the Development of Technologies for Carbon Recycling and Next-Generation Thermal Power Generation project being run by the New Energy and Industrial Technology Development Organization (NEDO).

Efforts to combat global warming are progressing, with the aim of achieving a carbon-neutral society by 2050. Against that backdrop, this project seeks to develop technology for the effective use of CO_2 emitted by factories and the like. The project partners recently carried out a test in which they produced para-xylene using methanol synthesized from CO_2 and hydrogen, conducting this at NEDO's R&D and Demonstration Base for Carbon Recycling at Osaki-Kamijima, Hiroshima (Figure 1).

Figure 1　Exterior view of the bench-scale testing facility at NEDO's R&D and Demonstration Base for Carbon Recycling

This project has seen the establishment of the component technologies shown in Figure 2 below, culminating in the demonstration of a technology for synthesizing para-xylene from methanol that has itself been synthesized from CO_2. Compared with production methods that use petroleum-based resources as feedstocks, the para-xylene obtained in this project affords a substantial reduction in CO_2 emissions.

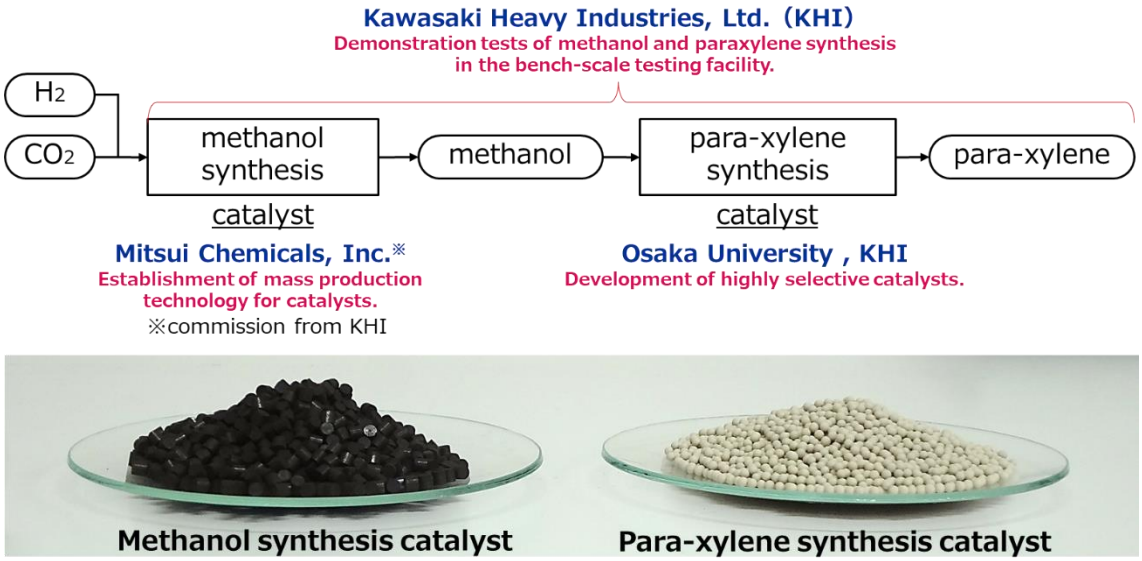

Figure 2　Overview and output of this project

In addition to conventional applications as an ingredient in chemical production, methanol is now beginning to be used in ships and more as a fuel with a lower environmental impact. Para-xylene, meanwhile, is a raw material utilized in purified terephthalic acid, and thus is also widely used in the manufacture of polyester resins for clothing and plastic bottles. Replacing conventional petroleum-based resources with CO_2 gathered via direct air capture – as well as via factory emissions – and converting it into methanol and para-xylene will lead to both lower emissions and the fixation of CO_2. Going forward, the partners in this project will work on further advances in pursuit of commercialization, helping to bring a carbon-neutral society to fruition.

For inquiries about this matter, please contact:
Professor NISHIYAMA Norikazu, Graduate School of Engineering Science, Osaka University
TEL: +81-6-6850-6255
E-mail: n.nishiyama.es@osaka-u.ac.jp

PR Department, Corporate Communication Group, Kawasaki Heavy Industries, Ltd.

Corporate Communications Division, Mitsui Chemicals, Inc.
TEL: +81-3-6880-7500
Inquiry form: https://form.mitsuichemicals.com/corporate/cc_pr_csr_en?param=13