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Joint Development of Propylene Production System Utilizing C4-Fraction By-products at Chiba Complex

Idemitsu Kosan Co., Ltd. (Idemitsu), Sumitomo Chemical Co., Ltd. (Sumitomo) and Mitsui Chemicals, Inc. (MCI) have commenced the joint development of a high-efficiency system for the production of propylene utilizing C4-fraction by-products at a complex in the Chiba region.

1. Background and Concept

Domestic refining and petrochemical businesses are strengthening cooperative ties within the industry to cope with the fierce international competition from emerging large-scale oil and petrochemical plants in the Middle East and China amid soaring crude oil prices. In addition, these industries are expected to further intensify their competitiveness through the integration of the production systems in their complexes.

Chiba is a major production base where Idemitsu, Sumitomo and MCI each have facilities for the production of petrochemical products and derivatives from olefins and aromatics. The companies operate closely located ethylene crackers and a fluid catalytic cracker (FCC). In addition, the complex is equipped with a pipeline network. The three companies decided that capitalizing on the advantages of their close location to develop a high-efficiency production system for clean fuel and propylene utilizing C4-fraction by-products from the refinery and petrochemical plants and ethylene as raw materials would strengthen their competitiveness. The companies have therefore embarked on a joint development project that includes a propylene conversion process as part of their Research Association of Refinery Integration for Group Operation (RING III) project.

2. Purpose of Joint Development

The joint development by the three companies focuses on the following three processes; (1) collecting ethylene and C4 fraction produced in refineries and petrochemical plants, (2) separating and concentrating normal butene from accumulated C4 fraction, and (3) converting concentrated normal butene to propylene. In this development, the companies will aim to achieve a high level of efficiency for each process, and will also design and build a comprehensive system by integrating each of the above processes.

Ethylene and propylene are generally produced in a 1-to-0.6 ratio in a conventional ethylene cracker. When the system in Chiba is completed, the ratio will be raised to over 0.9 and will boast the highest efficiency of any complex in Asia, thereby accelerating a shift to higher value-added propylene products.

3. Overview of High-Efficiency Propylene Production System

- Propylene production capacity: targeting 150,000 m.t./year
- R&D expenditure: Approx. ¥10 billion
(Investment ratio: Idemitsu 50%, Sumitomo 25%, and MCI 25%)
- Start of construction on R&D Center: FY2007
- Launch of trial verification: middle of FY2009

4. Overview of Process (please refer to attached materials)

The processes will collect C4-fraction by-products from the FCC of the refinery and the petrochemical plants producing ethylene. Isobutene will be separated from the C4 fraction through selective polymerization and converted into clean fuel. The concentrated normal butene obtained from the above process will undergo a catalyzed reaction with the ethylene collected from the production facilities of the three companies to produce propylene.

[The attachment shows a diagram of the processes described above.](#)

Attachment (reference)

