

# Development of Carbon Dioxide Recovery and Dimethyl Ether Synthesis Technologies

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## Abstract

Today, global warming has become a big issue. It is said that greenhouse gasses contribute to it and CO<sub>2</sub> have a big role among them. As a counter measure against global warming, since 1990, the Kansai Electric Power Co., Inc. (KEPCO) and Mitsubishi Heavy Industries, Ltd. (MHI) have been developing a chemical absorption method to recover CO<sub>2</sub> from the flue gasses emitted from thermal power plants. To reduce CO<sub>2</sub> recovery costs, we have developed a new energy-efficient solvent (KS-1) and low pressure-low loss packing for chemical absorption process, and have tested them in a pilot plant installed at Nanko power plant in Osaka. The first commercial flue gas CO<sub>2</sub> recovery plant using KS-1 solvent was established in a Malaysian urea plant in October 1999.

For the utilization of recovered CO<sub>2</sub>, sequestration in aquifer and/or ocean is under study in many laboratories, and the use as a raw material or a vital component in chemical industry is also discussed. KEPCO and MHI have developed a technique to synthesize dimethyl ether (DME, molecular formula CH<sub>3</sub>OCH<sub>3</sub>) directly from CO<sub>2</sub> etc. DME is attracting wide notice as new clean fuel. It has a low impact on the environment because no sulfur oxides and soot are formed, and NO<sub>x</sub> emissions are considerably low. Therefore, DME is considered to be a promising clean fuel for diesel engines, power generation plants, and an alternative to LPG.

In this paper, we show our technology of the CO<sub>2</sub> chemical absorption and the DME synthesis from CO<sub>2</sub>.