Current Research on CO_2 Recovery and Utilization in Taiwan

CHUNG-SUNG TAN
Professor, Department of Chemical Engineering National Tsing Hua University

Abstract

The Kyoto protocol in which 163 nations had ratified became effective on February 16, 2005. The annual CO_2 emission by Taiwan was about 270 million metric tons in 2005, ranked as the 22nd in the world. The CO_2 emission per capita was 12.4 metric tons, much higher than the global average 3.98 metric tons. Though Taiwan is not a member of the United Nations and is not required to reduce carbon emission under the present agreement, a high pressure for reducing CO_2 emission should come in the future due to a large CO_2 emission. Besides, 99.7 % of energy is imported in Taiwan. In a consequence, an attention should be paid to the impacts of reducing annual CO_2 emission on development of economics and industries.

The techniques related to recovery of CO_2 from the exhausted gas of power generation plants and utilization of CO_2 are discussed in this note. The existing and under-development technologies for CO_2 recovery and utilization in the world are briefly reviewed first, and then the current researches in Taiwan are reported. Regarding CO_2 recovery, though there is no demonstration plant in Taiwan at this time, many papers for absorption and adsorption have been published in technical journals, indicating a ready research capability in universities. Regarding CO_2 utilization, in addition to the direct use of CO_2 in soft drink, welding, foaming, propellant, and etc, several processes with a use of supercritical CO_2 as the cleaning agent and solvent are existing. A local company has used CO_2 as the starting reactant to make ethylene carbonate for production of polycarbonate used in display industry for years. This is the first company in world using this reaction pathway. In academia, many projects for production of chemicals via catalyst and photocatalysis are being carried out. The approaches in all the projects follow the ideas of sustainability and cleaner production.