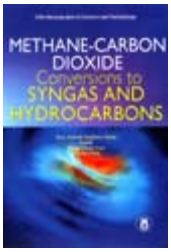

Methane–Carbon Dioxide: Conversions to Syngas and Hydrocarbons

Authors: Nor Aishah Saidina Amin, Istadi, Tung Chun Yaw, Ruzina Isha

- 2008
- ISBN 978-983-52-0472-2
- 110 pages
- RM 35.00
- Subject Chemical and Natural Resource Engineering

This monograph describes the new innovation that has recently been developed for the CH_4–CO_2 conversions process. Optimization of CO_2 reforming of methane to synthesis gas with the help of experimental design, empirical modeling and ANN modeling are developed for CORM in presence of oxygen. An overview on dynamic equilibrium analysis has shown that an increase of sweep factors induced more significant enhancement hydrogen permeation than permselective area. The NiO/CeO_2 catalyst showed potential as catalyst for the CORM. The application of a hybrid catalytic DBD plasma reactor has the potential for the co–generation of C^{2+} hydrocarbons and synthesis gases from methane and carbon dioxide. Carbon dioxide as co–feed has important effects on the carbon suppression. It can be concluded that three factors, i.e. CH_4/CO_2 feed ratio, total feed flow rate, and discharge voltage, in the DBD plasma reactor system have significant effects on the reactor performance. The hybrid catalytic DBD plasma reactor is more suitable for CO_2 OCM process than the conventional catalytic reactor over CaO–MnO/CeO_2 catalyst. Further innovation and improvement of current research on CH_4 and CO_2 are required to increase conversion and selectivity and to commercialize the process.

Nor Aishah Saidina Amin is a Professor at the Department of Chemical Engineering, Faculty of Chemical and Natural Resources Engineering, Universiti Teknologi Malaysia. She graduated with a B.Sc (Chemical Engineering) from California State University, U.S.A; M.Sc (Chemical Engineering) from University of Manchester Institute of Science & Technology (UMIST); and Ph.D in Chemical Engineering from Illinois Institute of Technology, USA. She has published numerous articles in international and local refereed journals in the area of applied catalysis, chemical reactor, and reaction engineering. She has led a number of research projects involving conversions of methane and palm oil to chemicals and fuels. Prof. Dr. Nor Aishah has also served as reviewer to many international refereed journals.

Istadi is an Assistant Professor of Chemical Engineering at Diponegoro University. He earned his B.Eng from Diponegoro University, Indonesia; M.Eng from Institut Teknologi Bandung, Indonesia; and Ph.D from Universiti Teknologi Malaysia. He has published numerous refereed articles in reputable international journals and a book published by Elsevier on utilization of carbon dioxide contented–natural gas for fuels production with an emphasis on development of plasma reactor. He has also been appointed as reviewer for numerous reputable international journals.

Tung Chun Yaw is a Process Engineer at Titan Petrochemicals (M) Sdn. Bhd. in Pasir Gudang, Johor. He obtained his M.Eng from Universiti Teknologi Malaysia.

Ruzina Isha is a lecturer at Universiti Malaysia Pahang. She obtained her M.Eng from Universiti Teknologi Malaysia.

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