SEMINAR SERIES

International Institute for Carbon-Neutral Energy Research
Kyushu University

Title

Paradigm Shift in Energy Science and Technology: from Energy Cascading to Exergy Recuperation

Speaker

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Friday, May 17, 2013 4:00 p.m.

Place

I²CNER Hall, Ito campus, Kyushu University

Abstract

The climate change, especially global warming due to CO_2 emission from the combustion of fossil fuels, has been a major concern in the last few decades. In order to mitigate the global warming the reduction of energy consumption is essential in terms of energy saving and efficient utilization. So far, heat recovery technology based of the heat cascading utilization principle has been adopted to reduce energy consumption in the industrial processes. However, energy saving by heat recovery in industrial processes has its limitations. More energy-efficiency improvement is required.

Recently, we have advanced self-heat recuperation technology based on the exergy recuperative heat utilization principle, which can recirculate process heat by providing compression work instead of heat generated by fuel combustion. The self-heat recuperation can recover not only latent heat but also sensible heat in the thermal process, leading to a considerable reduction in the energy consumption for industrial processes: the exergy recuperative gasification process, self-heat recuparative thermal process, self-heat recuperative distillation processes, exergy recuperative CO_2 gas separation processes, and self-heat recuperative drying processes. The exergy recuperation causes a paradigm shift in energy science and technology which leads to revolutionary energy saving. In the present lecture, a state-of-the-art self-heat recuperation technology based on the concept of exergy recuperation is surveyed and some examples are discussed.

Keywords: exergy, self-heat recuperation, energy efficiency, exergy recuperation, energy saving

About the Speaker

Prof. Atsushi Tsutsumi is the Professor of Institute of Industrial Science at the University of Tokyo, Japan. He received his Doctorate of Engineering from the University of Tokyo in 1986. He has been active in research on material and energy coproduction based on exergy recuperation technology, exergy recuperative advanced IGCC/IGFC, innovative energy conservation by self-heat recuperation, fuel cell/battery (FCB) with energy sparkling and hydrogen production by biomass gasification for the last ten years. He has published over 168 scientific publications, 288 proceedings in international journals and conferences and 25 books.

Host: Professor Kuniaki Honda

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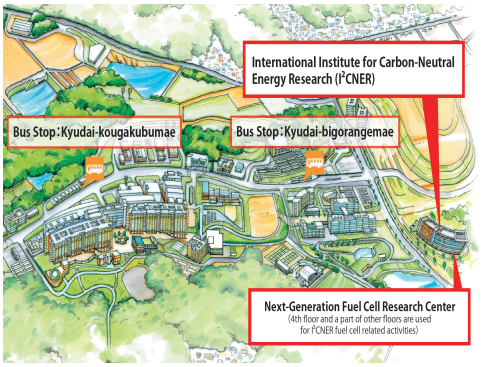

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