2014 Annual Meeting of The Institute of Electrostatics Japan
Hiroshima International University
September 7-8, 2014

8pB-1

September 8th (Mon.), <15:00-15:45>
Room 2

Interaction of nonthermal plasma and Ag-supported zeolite

Hyun-Ha Kim

National Institute of Advanced Industrial Science and Technology

Abstract:

In this work, we report the interaction of nonthermal plasma and Ag-supported zeolite for the effective removal of volatile organic compounds (VOCs). The Si/Al ratio affected the status of Ag, which in turn leaded to a different catalytic performance. The higher the Si/Al ratio, the higher the metallic Ag and the larger the reduction in relative resistivity. The propagation of surface streamer became weak as the Si/Al ratio increased. These electro- and physical properties of zeolites were found to be closely linked with the catalytic activity of Ag/zeolite. The direct interaction of surface plasma with the surface of zeolite was also evidenced by the electron spin resonance (ESR) spectrometer. The possible mechanism on these observation will be discussed.

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8pB-2

September 8th (Mon.), <15:00-15:45>
Room 2

Experiment and Simulation of CO2 Decomposition Using Dielectric Barrier Discharge

○Yota YOSHIDA, Naoki SHIRAI, Satoshi UCHIDA, Fumiyoshi TOCHIKUBO

Tokyo Metropolitan University,

Abstract:

We studied CO2 decomposition using dielectric barrier discharge and packed bed discharge with coaxial electrode configuration at atmospheric pressure aiming the conversion into methanol. To discuss the possibility of conversion of CO2 into methanol, the reaction pathway was investigated by the reaction simulation using CHEMKIN. The simulation results suggest that the rate-limiting reaction is the hydrogenation of CH2O.

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8pB-3

September 8th (Mon.), <15:00-15:45>
Room 2

Effect of Reverse Water-Gas Shift and Methanation Reactions on Plasma-assisted Dry Methane Reforming

○Seigo KAMESHIMA*, Keishiro TAMURA*, Sampson MOORE**, Tomohiro NOZAKI*

*Dept. of Mechanical Sciences and Engineering, Tokyo Institute of Technology,
**Dept. of Mechanical Engineering, University of Minnesota

Abstract:

This study focuses on the reaction mechanism of low temperature plasma-assisted dry methane reforming (DMR). At low temperature (< 500 °C), CO_2 is reduced by H_2 catalytically, which may produce either CO ($CO_2 + H_2 = CO + H_2O$; reverse water-gas shift reaction) or CH_4 ($CO_2 + 4H_2 = CH_4 + 2H_2O$; methanation). We found that the RWGS is dominant reaction pathway, while CH_4 production has negligible effect. Plasma-catalyst hybrid reaction converted CO_2 beyond chemical equilibrium. On the other hand, H_2 conversion was smaller than CO_2 conversion probably because the formation of water is probably the rate-determining step for the RWGS.

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8pC-1

September 8th (Mon.), <16:00-16:45>
Room 2

Study on the Decomposition Performance of the Formaldehyde by Photocatalyst which Processed by the Indirect Dielectric Barrier Discharge

○Tomonari TSURUMI, Masashi TOJO, Shota YAZAWA, Yusuke KUDO, Tetsuro OTSUKA

College of Industrial Technology, Nihon University

Abstract:

A photocatalyst works by only light. It is very clean and can be used semipermanently. Therefore, a photocatalyst is environment-friendly. A photocatalyst has a useful characteristic such as an oxidative decomposition and a super-hydrophilicity. We have been studying about the removal performance of the formaldehyde by photocatalyst substrate which processed by an electric discharge. In this study, indirect electric discharge was used for processing substrates. The evaluation method of substrate was formaldehyde decomposition.

2014 Annual Meeting of The Institute of Electrostatics Japan
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8pC-2

September 8th (Mon.), <16:00-16:45>
Room 2

Study on HCHO Decomposition Performance of Photocatalyst Substrate Produced by Electrostatic Atomization

Shota YAZAWA, Tomonari TSURUMI, Masayuki EGASHIRA, Yusuke KUDO, Tesuro OTSUKA and Junji KOIDO

College of Industrial Techology, Nihon University

Abstract:

A photocatalyst works by only light. It is very clean and can be used semipermanently. Therefore, a photocatalyst is environment-friendly. A photocatalyst has a useful characteristic such as an oxidative decomposition and a super-hydrophilicity. We have been studying about fabrication of photocatalyst substrate which produced by an electrostatic atomization. In this study, photocatalyst substrates were produced by an electrostatic atomization in cone-jet mode. The evaluation method of substrate was formaldehyde decomposition.

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8pC-3

September 8th (Mon.), <16:00-16:45>
Room 2

Fundamental characteristics of sheet stapler using positive and negative corona charging

○Keisuke OZAWA, Toshiyuki SUGIMOTO, Nobuo NOMURA

Yamagata University*, KASUGA DENKI. INC. **

Abstract:

Although there are many sheet products stuck by glue or adhesive material, it is very difficult to stick and peel with keeping strong force by these adhesive materials. In this study, we proposed an electrostatic sheet stapler that can stick and peel the sheet material by an electrostatic force. The sheet material is charged by the positive and negative corona charging using two needle and grid electrodes. It was found that the electrostatic sheet stapler can control sticking and peeingl force by the corona charging and charge elimination and that the sticking force is over than 50gf/cm2.