2

Pacifichem Selected Abstracts

Sunday, Dec. 18 PM - Poster Presentations				
Presentation Time/ Session Start Time	**Location**	**Prog. #/Type**	**Authors Institutions**	**Abstract Title Session #/Title**
Sunday, Dec. 18, 8:00 PM - 10:00 PM/ 8:00 PM	Renaissance Ilikai - Ballroom A/B/C/D/E	678 Poster	Y.Sakaguchi[1]; S.Kaneco[1]; H.Katsumata[1]; T.Suzuki[2]; K.Ohta[1] 1. Department of Chemistry for Materials, Faculty of Engineering, Mie University, Tsu, Mie, Japan; 2. Environmental Preservation Center, Mie University, Tsu, Mie, Japan	**Electrochemical reduction of carbon dioxide at copper - modified nickel electrode in water + methanol 694 Clean and Green Technologies for a Sustainable Environment (#71) [PS]**

Electrochemical reduction of carbon dioxide at copper - modified nickel electrode in water + methanol

Y.Sakaguchi[1]; S.Kaneco[1]; H.Katsumata[1]; T.Suzuki[2]; K.Ohta[1]
1. Department of Chemistry for Materials, Faculty of Engineering, Mie University, Tsu, Mie, Japan; 2. Environmental Preservation Center, Mie University, Tsu, Mie, Japan

Program Number: 678
Presentation Time: Sunday, Dec. 18, 8:00 PM - 10:00 PM
Location: Renaissance Ilikai - Ballroom A/B/C/D/E

In the electrochemical reduction of carbon dioxide, in water, at most metal electrodes the major reaction products were carbon monoxide and formic acid. However, only copper has proven a suitable electrode for the formation of hydrocarbons such as methane and ethylene, which can be used as fuel gases. Recently, many investigators have actively studied the electrochemical reduction of carbon dioxide using various metal electrodes in organic solvents, given that organic aprotic solvents dissolve much more carbon dioxide than water. Reduced products containing carbon monoxide, oxalic acid and formic acid were produced by the electroreduction of carbon dioxide in dimethyl sulfoxide, N,N-dimethyl formamide, propylene carbonate and acetonitrile. However, even at a copper electrode, no hydrocarbons were obtained in these organic solvents. Methanol is a better solvent of carbon dioxide than water, particularly at low temperature. The solubility of carbon dioxide in methanol is approximately five times that in water, at ambient temperature and eight to fifteen times that in water, at temperatures below 273 K. Therefore, methanol has been industrially used as a physical absorbent of carbon dioxide in the Rectisol method, at 243-263 K. Currently, over 70 large-scale plants apply the Rectisol process. In the present work, the electrochemical reduction of carbon dioxide at copper-modified nickel in water + methanol was investigated for the formation of hydrocarbons. The electrodeposition amount of copper into the nickel surface was optimized.

Citation: Y.Sakaguchi, S.Kaneco, H.Katsumata, T.Suzuki, K.Ohta. Electrochemical reduction of carbon dioxide at copper - modified nickel electrode in water + methanol Program No. 678. *2005 Abstract Viewer.* The International Chemical Congress of Pacific Basin Societies