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## List of Publications, the Research Institute for Catalysis (1976)

In 1976, the following papers by the members of the Research Institute for Catalysis, Hokkaido University were published.

### I. Ordinary articles

Adsorption Isotherm and the States of Adsorption

J. HORIUTI and T. TOYA

This Journal, **24**, 159 (1976).

Self-Consistent Theory of the Martensitic Phase Transformation in Metallic Lithium\*)

R. P. BAJPAI, M. ONO, Y. OHNO and T. TOYA

Phys. Rev. B **12**, 2194 (1975).

Adsorption of Water on Au and Mercury on Au, Ag, Mo and Re: Measurements of the Changes in Work Function

R. P. BAJPAI, H. KITA and K. AZUMA

Japan. J. Appl. Phys., **15**, 2083 (1976).

The Intermediates Formed on MoS<sub>2</sub> in the Olefin Exchange Reactions and Their Properties

T. OKUHARA, T. KONDO, K. TANAKA and K. MIYAHARA

Shokubai (Catalyst), **18**, 87 P (1976) (in Japanese).

Reaction Structure Analysis of Ethylene Hydrogenation on Metallic Catalysts

S. SATO and K. MIYAHARA

Shokubai (Catalyst), **18**, 153 (1976) (in Japanese).

Catalytic Activity of Iron Sulfates for Friedel-Crafts Type Benzylolation of Toluene with Benzyl Chloride

K. ARATA, K. SATO and T. TOYOSHIMA

J. Catalysis, **42**, 221 (1976).

Friedel-Crafts Reaction in the Heterogeneous System V.

Friedel-Crafts Benzylolation and Benzylolation of Toluene Catalyzed by Calcined Iron Sulfates

K. ARATA, K. YABE and I. TOYOSHIMA

J. Catalysis, **44**, 385 (1976).

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\*) This paper was published in 1975, but we were unable to include it in a similar list given at the end of Vol. 23 (1975) of this Journal (Editor).

*List of Publications*

- Nitrogen Chemisorption on Reduced Cobalt Oxide with and without  $K_2O$   
M. SUZUKI and I. TOYOSHIMA  
Proceedings of the 6th International Congress on Catalysis, London, 1976.
- Thermal Desorption Apparatus Made for Trial and Its Facilities  
I. TOYOSHIMA, K. RYO and M. HASHIMOTO  
Sinku (Vacuum), **19**, 348 (1976) (in Japanese).
- The Low-Temperature Catalytic Oxidation of CO with  $N_2O$  by Molybdenum  
Oxide Supported on Silica Gel  
A. KAZUSAKA and J. H. LUNSFORD  
J. Catalysis, **45**, 25 (1976).
- Oxidation of CO with  $N_2O$  by Means of Molybdenum Catalysts  
A. KAZUSAKA and J. H. LUNSFORD  
Shokubai (Catalyst), **18**, 27 P (1976) in (Japanese).
- Application of the Theory of Stoichiometric Number Determination of the  
Rate-determining Step: The Mechanism of Water-gas Shift Reaction  
Catalyzed by Platinum  
M. MASUDA  
This Journal, **24**, 83 (1976).
- Kinetic Study of Electron Transfer Step of Hydrogen Electrode Reaction on  
Metals  
A. MATSUDA, R. NOTOYA, T. OHMORI, K. KUNIMATSU and T. KUSHIMOTO  
This Journal, **24**, 187 (1976).
- Study of the Effect of Solution pH to the Surface State of Rhodium Electrode  
in Aqueous Solution of KCl  
R. NOTOYA and O. A. PETRII  
Doklad' Akademii Nauk USSR, **226**, 117 (1976) (in Russian).
- Interaction between Adsorbed Atoms and Conduction Electrons of Thin  
Evaporated Films  
M. WATANABE  
Thin Solid Films, **36**, 65 (1976).
- Change of Mechanism of the Hydrogen Electrode Reaction with Overpotential  
III. Potential Dependence of the Deuterium Separation Factor on Pt,  
Au, and Ni Cathodes  
M. ENYO  
Electrochim. Acta, **21**, 15 (1976).

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Hydrogen Electrode Reaction Mechanism on Pd and Its Relevance to Hydrogen Sorption

M. ENYO and T. MAOKA

Surface Technology, **4**, 277 (1976).

Elementary Reaction Rates of the Hydrogen Electrode Reaction on Ni Analyzed by Means of Deuterium Tracer I. The Anodic Region

T. MATSUSHIMA and M. ENYO

Electrochim. Acta, **21**, 241 (1976).

Elementary Reaction Rates of the Hydrogen Electrode Reaction on Ni Analyzed by Means of Deuterium Tracer II. The Cathodic Region

T. MATSUSHIMA and M. ENYO

Electrochim. Acta, **21**, 823 (1976).

Studies on the Mechanism of the Hydrogen Ionization Reaction on Rh in Alkaline Solution by Means of Deuterium Tracer

T. MATSUSHIMA and M. ENYO

Electrochim. Acta, **21**, 1029 (1976).

On the Mechanism and Kinetics of the CO-oxidation Reaction on Polycrystalline Palladium. I. Reaction Paths\*)

T. MATSUSHIMA and J. M. WHITE

J. Catalysis, **39**, 265 (1975).

On the Mechanism and Kinetics of the CO-oxidation Reaction on Polycrystalline Palladium. II. The Kinetics\*)

T. MATSUSHIMA, D. B. ALMY, D. C. FOYT, J. S. CLOSE and J. M. WHITE

J. Catalysis, **39**, 277 (1975).

Kinetics of the Reaction of Oxygen with Carbon Monoxide Adsorbed on Palladium\*)

T. MATSUSHIMA and J. M. WHITE

J. Catalysis, **40**, 334 (1975).

The Adsorption of Carbon Monoxide on Palladium During the Catalyzed Reaction,  $\text{CO} + \frac{1}{2}\text{O}_2 \rightarrow \text{CO}_2$

T. MATSUSHIMA, C. J. MUSSETT and J. M. WHITE

J. Catalysis, **41**, 397 (1976).

Thermal Decomposition of Methanol Adsorbed on Alumina

T. MATSUSHIMA and J. M. WHITE

J. Catalysis, **44**, 183 (1976).

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\*) See the footnote on p. 227.

*List of Publications*

## Molecular Orbital Studies of Hydrogen Adsorption on Ni and Cu Surfaces

H. ITOH

Japan. J. Appl. Phys., **15**, 2311 (1976).The Second  $^3\Sigma_u^-$  State of  $O_2$ 

M. YOSHIMINE, K. TANAKA, H. TATEWAKI, S. OBARA, F. SASAKI and K. OHNO

J. Chem. Phys., **64**, 2254 (1976).

## Variational Calculation of Low-Energy Electron Diffraction Spectra

Y. HAMAUZZU

J. Phys. Soc. of Japan, **41**, 958 (1976).

## Diffraction of a Molecular Beam at Solid Surfaces

Y. HAMAUZZU

Bussei Kenkyu, **26**, 65 (1976) (in Japanese).**II. Short Notes and Letters**

## Number of Active Sites and Turnover Number for Heterogeneous Catalysis

MIYAHARA and A. KAZUSAKA

This Journal, **24**, 65 (1976).

## Determination of the Dependence of the Hydrogen Ion Adsorption on Iridium in Solution pH at Reversible Hydrogen Potential

R. NOTOYA and O. A. PETRII

Elektrokhimiya, **12**, 655 (1976) (in Russian).

## Evidence for Two Kinds of Active Sites on a Molybdenum Sulfide

K. TANAKA, T. OKUHARA, S. SATO and K. MIYAHARA

J. Catalysis, **43**, 360 (1976).Olefin Metathesis Reaction on a  $MoS_2$  Catalyst

T. OKUHARA and K. TANAKA

J. Catalysis, **42**, 474 (1976).

## Conservation of Hydrogen Molecularity in the Hydrogenation of Olefins over Molybdenum Sulfide

T. OKUHARA, K. TANAKA and K. MIYAHARA

J. Chem. Soc., Chem. Comm., **42** (1976).Orientation in the Addition of HD to Butadiene on  $MoS_2$ 

T. OKUHARA and K. TANAKA

J. Chem. Soc., Chem. Comm., **199** (1976).

*List of Publications*

- Intermediate of the Hydrogenation of Butadiene on a MoS<sub>2</sub> Catalyst  
T. OKUHARA, T. KONDO and K. TANAKA  
Chem. Letters, 717 (1976).
- Intermediate of the Homomolecular Oxygen Exchange Reaction at Liquid Nitrogen Temperature  
K. TANAKA and A. KAZUSAKA  
Chem. Phys. Lett., **39**, 536 (1976).
- Restricted Rotation of  $\sigma$ -alkyl Intermediates on a MoS<sub>2</sub> Catalyst  
T. OKUHARA and K. TANAKA  
J. Am. Chem. Soc., **98**, 7884 (1976).
- Variational Calculation of the Intensity-Energy Spectra of Low-Energy Electron Diffraction by the Nickel (100) Surface  
Y. HAMAUZU  
Physics Letters, **56A**, 417 (1976).
- Resonance Minima and Maxima in the Diffraction Intensities of Atomic Beams from Solid Surfaces  
Y. HAMAUZU  
Physics Letters, **57 A**, 275 (1976).
- Calculation of the Fast Electron Scattering Cross Sections from the Hydrogen Molecule (Errata)  
S. ISHI and K. TANAKA  
J. Phys. Soc. Japan, **41**, 1800 (1976).

**III. Review articles**

- Reaction Structure of Ethylene Hydrogenation on Metals  
S. SATO  
This Journal, **24**, 127 (1976).
- Adsorbed Oxygen Species on Heterogeneous Catalysts and Their Reactivity  
K. TANAKA  
Kagaku Kogyo (Chemical Industry), **27**, 504 (1976) (in Japanese).
- On the Papers, "Chemical Reaction on Surfaces" and "The Mechanism of the Catalytic Action of Platinum in the Reactions  $2\text{CO} + \text{O}_2 = 2\text{CO}_2$  and  $2\text{H}_2 + \text{O}_2 = 2\text{H}_2\text{O}$ " by I. LANGMUIR  
K. TANAKA  
*Kagaku no Genten* (Classic Papers in Chemistry) Vol. 6, Tokyo University Press, Tokyo, 1976, p. 157 (in Japanese).

*List of Publications*

On the Paper, "The Mechanism of the Hydrogen Electrode Process on Platinum" by J. HORIUTI and M. IKUSHIMA

M. ENYO and T. KEII

*Kagaku no Genten* (Classic Papers in Chemistry) Vol. 6, Tokyo University Press, Tokyo, 1976, p. 116 (in Japanese).

Electronic Theory of Solid Surfaces

T. TOYA

Bussei Kenkyu, **26**, C95 (1976) (in Japanese).