



Title	List of Publications from the Research Institute for Catalysis (1979)
Citation	JOURNAL OF THE RESEARCH INSTITUTE FOR CATALYSIS HOKKAIDO UNIVERSITY, 28(1), 73-77
Issue Date	1980-08
Doc URL	http://hdl.handle.net/2115/25075
Type	bulletin (article)
File Information	28(1)_P73-77.pdf



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**List of Publications from the Research
Institute for Catalysis (1979)**

In 1979, the following papers by the members of the Research Institute for Catalysis, Hokkaido University, were published.*)

I. Ordinary Articles

Activation Energy of Constituent Elementary Steps of Hydrogen Evolution Reaction on Nickel in Aqueous Sodium Hydroxide

R. NOTOYA and A. MATSUDA

J. Res. Inst. Catalysis, **27**, 1 (1979).

Standard Molal Real Free Energies of Solvation of Individual Ions and Electromotive Forces of Single Electrodes in Non-Aqueous Solutions

A. MATSUDA

J. Res. Inst. Catalysis, **27**, 101 (1979).

Activation Energy of Electron Transfer Step of Hydrogen Evolution Reaction on Nickel in Aqueous Lithium and Cesium Hydroxide

R. NOTOYA and A. MATSUDA

J. Res. Inst. Catalysis, **27**, 95 (1979).

Proportionality of Standard Molal Real Free Energies of Solvation of Mono-atomic Ions in Fused Salts and in Water

R. NOTOYA and A. MATSUDA

J. Res. Inst. Catalysis, **27**, 119 (1979).

The Coupled-Control of Electrode Processes. Experimental Evidences and Interpretations

M. ENYO

J. Res. Inst. Catalysis, **27**, 63 (1979).

Analysis of the Coupled-Controlled Reaction and Activity of the Reaction Intermediate

M. ENYO

Denki-kagaku (Electro-chemistry), **47**, 2 (1979) (in Japanese).

Overpotential Decay Transients and the Reaction Mechanism on the Pd-H₂ Electrode

T. MAOKA and M. ENYO

Surface Technology, **8**, 441 (1979).

*) A similar list for 1978 appeared in Vol. 27, No. 1 (1979) of this Journal.

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- The Effect of Surface Active Substances on the Overpotential Components of the Pd-H₂ Electrode
T. MAOKA and M. ENYO
Surface Technology, **9**, 147 (1979).
- A Computer Simulation on the Overpotential Transients in the Coupled-Controlled Electrode Reaction and Some Analytical Approaches
T. YOKOYAMA and M. ENYO
Electrochim. Acta, **24**, 997 (1979).
- ESR and NMR Studies of Hydrogen Adsorbed on Fine Particle ZnO and its Accumulation Layer
M. WATANABE and T. ITO
Shinku (Vacuum), **22**, 296 (1979) (in Japanese).
- Reflection of Light from Gas-Adsorbed Thin Metallic Films and Their Electrical Resistance
M. WATANABE and A. HIRATUKA
Surface Science, **86**, 398 (1979).
- Optical Reflectance and Electrical Resistance of Gas Adsorbed Thin Metallic Films
M. WATANABE and A. HIRATUKA
Japan. J. Appl. Phys., **18**, 31 (1979).
- Specular Reflection of Helium and Hydrogen Molecular Beams from the (111) Plane of Silver
H. ASADA
Surface Science, **81**, 386 (1979).
- Kinetic Studies on the the CO Oxidation over Iridium Metal
T. MATSUSHIMA
Shokubai (Catalyst), **21**, 37 P (1979) (in Japanese).
- On the Kinetics and Mechanism of the CO Oxidation over Polycrystalline Iridium
T. MATSUSHIMA, M. HASHIMOTO and I. TOYOSHIMA
J. Catalysis, **58**, 303 (1979).
- Kinetic Studies on the CO Oxidation over Platinum by Means of Carbon 13 Tracer
T. MATSUSHIMA
Surface Science, **79**, 63 (1979).

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- Tracer Studies on the Reaction Path and Kinetics of the CO Oxidation over Iridium
T. MATSUSHIMA
Surface Science, **87**, 665 (1979).
- A Systematic Preparation of New Contracted Gaussian-Type Orbital Set.
1. Transition Metal Atoms from Sc to Zn
H. TATEWAKI and S. HUIJINAGA
J. Chem. Phys., **71**, 4339 (1979).
- Configuration-Interaction Study of Lower Excited States of O_2 : Valence and Rydberg Characters of the Two Lowest $^3\Sigma_u^-$ -States
H. TATEWAKI, K. TANAKA, F. SASAKI, S. OBARA, K. OHNO and M. YOSHIMINE
Int. J. of Quant. Chem., **15**, 533 (1979).
- R-Matrix Study of Resonance Spectra of the Neon Atom
T. NORO, F. SASAKI and H. TATEWAKI
J. Phys. B, **12**, 2217 (1979).
- Surface Chemistry and Catalysis of $Mo(CO)_6$ Adsorbed on $\gamma-Al_2O_3$
A. KAZUSAKA and R. F. HOWE
Shokubai (Catalyst), **21**, 333 (1979) (in Japanese).
- Hydrogenation of 1,3-Butadiene by Cyclohexadiene over CoS Catalyst
Katsumi TANAKA, Ken-ichi TANAKA and K. MIYAHARA
J. Catalysis, **59**, 423 (1979).
- Catalytic Reduction of CO_2 . 1. Reduction of CO_2 with Carbon Carrying Potassium Carbonate
S. YOKOYAMA, K. MIYAHARA, K. TANAKA, I. TAKAKUWA and J. TASHIRO
Fuel, **58**, 510 (1979).
- Methanation of CO over Ruthenium Supported on Silica and Titanium Oxide
H. NISHIJIMA, K. TANAKA, A. KAZUSAKA and K. MIYAHARA
Shokubai (Catalyst), **21**, 256 (1979) (in Japanese).
- Olefin Metathesis Reaction over Supported Molybdenum Oxides
Katsumi TANAKA, Ken-ichi TANAKA and K. MIYAHARA
Shokubai (Catalyst), **21**, 283 (1979) (in Japanese).
- Surface Properties and Catalytic Activities on $TiO_2-Al_2O_3$ Catalyst
K. TANABE, E. RODANAS, H. HATTORI, T. YAMAGUCHI, Y. TANAKA
I. TOYOSHIMA
Shokubai (Catalyst), **21**, 214 (1979).

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Adsorbed States of CO, NH₃, C₂H₂ and C₂H₄ over (110) and (100) Crystal Surfaces of Iron

K. YOSHIDA, K. MIYAHARA and I. TOYOSHIMA
Shokubai (Catalyst), **21**, 328 (1979) (in Japanese).

X-ray Photoelectron Spectroscopic Studies of Iron Oxides Catalysts Prepared from the Calcination of Iron Sulfates at High Temperature

K. YABE, K. ARATA and I. TOYOSHIMA
J. Catalysis, **57**, 231 (1979).

II. Letters and Short Communications

Spin Trapping of Adsorbed Hydrogen

T. UDA, A. KAZUSAKA, R. F. HOWE and G. W. KEULKS
J. Am. Chem. Soc., **101**, 2758 (1979).

Novel Catalyst, MoO_x-β-TiO₂, for the Olefin Metathesis Reaction with No Hydrogen Scrambling

Katsumi TANAKA, Ken-ichi TANAKA and K. MIYAHARA
J. C. S., Chem. Comm., 1979, 314.

III. Notes

Standard Molal Real Free Energies of Hydration of Monoatomic Ions and Standard Electromotive Forces of Single Electrodes in Aqueous Solutions

A. MATSUDA
J. Res. Inst. Catalysis, **27**, 167 (1979).

Compensation Effect of Adsorbed Intermediate on the Rate of Electron Transfer Step of Hydrogen Evolution Reaction

A. MATSUDA, R. NOTOYA and T. OHMORI
J. Res. Inst. Catalysis, **27**, 27 (1979).

Effect of the Hydrogen Pretreatment of Palladium on Its Catalytic Properties for Olefin Hydrogenation

S. SATO
J. Res. Inst. Catalysis, **27**, 89 (1979).

IV. Reviews

Role of Electron Work Function in Setting-up of Electrode Potential and in Electrode Kinetics.

—Basic Concepts Developed by Frumkin—

A. MATSUDA
J. Res. Inst. Catalysis, **27**, 31 (1979).

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Catalytic Characters of Solid

K. MIYAHARA

Kotai-butsuri (Physics of Solids), **14**, 297 (1979) (in Japanese).

Studies of Surface Characterization by Electron Spectroscopy and its Application to Catalytic Science

I. TOYOSHIMA

Annual Report on Research Development (Chemistry), p. 140, 1979.

Heat of Chemisorption of O_2 , H_2 , CO , CO_2 and N_2 on Polycrystalline and Single Crystal Transition Metal Surfaces

I. TOYOSHIMA and G. A. SOMORJAI

Cat. Rev. Sci. Eng., **19**, 105 (1979).