No. 1

THE

REVIEW OF PHYSICAL CHEMISTRY

OF JAPAN

Founded in 1926

SPECIAL EDITION

THE CO-OPERATIVE RESEARCHES ON THE FUNDAMENTAL STUDIES OF THE LIQUID PHASE REACTIONS AT HIGH PRESSURES

CONTENTS

Jiro Osugi: Forward on the Co-operative Researches 1
Yoshiaki Ogo and Tatsuya Imoto: Solvent Effects en Several polymerizations under High pressure
Hiroji Iwasaki and Mitsuo Takahashi: Studies on the Transport properties of Fluids at High Pressure I: The Viscosity of Ammonia
Shinji Takahashi and Hiroji Iwasaki: Studies on the Transport Properties of Fluids at High Pressure II: The Diffusion of ¹⁴ CO ₂ in the Carbon Dioxide-Argon and Carbon Dioxide-Methane Systems at High Pressures
Tadashi Makita and Toshiharu Takagi: Ultrasonic Velocity in Liquid and Thermodynamic properties of Benzene and Carbon Tetrachloride under Pressures41
Takashi Moriyoshi and Kazuo Mikami: The Effect of Pressure and Temperature on the Base-catalyzed Condensation of Cyclohexanone
Jiro Osugi, Masanori Sato and Naoyuki Ifuku: The Effect of Pressure and Temperature on the Micelle Formation of Dodecylbenzylammoniumchloride Solution
Keizo Suzuki, Yoshiaki Miyosaya, Masao Tsuchiya and Yoshihiro Taniguchi: Biopolymer Solutions and Model Systems under High Pressure
Yoshimasa Takezaki, Hiroshi Teranishi, Nobuyuki Sugita and Kiyoshi Kudo: High Pressure Syntheses of Aromatic Aldehydes
Gen-ichi Kaminishi and Taturo Toriumi: Vapor-liquid Equilibria in the Systems:

THE REVIEW OF PHYSICAL CHEMISTRY OF JAPAN

(Butsuri-Kagaku no Shinpo)

Found in 1926

Members of Council:

Azuma Okuda (Chief)

J. Osugi

S. Kachi

I. Tsujikawa

K. Kodera

H. Takagi

A. Kaji

R. Goto
T. Yamamoto

H. Hatano W. Jono A. Saika

T. Fujinaga

R. Goto

H. Katsuki

E. Suito

Board of Editors:

J. Osugi (Chief)

Kyoto University

W. Jono (Associate) Osaka Women's University

R. Goto (

) Kyoto University

E. Suito (

) Kyolo University

S. Shida

Tokyo Institute of Technology

...

Tonyo Institute of I

T. Kitagawa

Yokohama University

M. Tamura

Kyoto University

H. Matsuyama

Doshisha University

T. Makita

1 . 1.1mm1cm

University of Kobe

K. Suzuki

Ritsumeikan University

K. Hirota

K. Hhou

University of Osaka

S. Seki

University of Osaka

T. Ishino

Chiteratty of Cauca

e.

Himeji Institute of Technology

T. Imoto

Osaka City University

R. Fujishiro

Municipal University of Osaka

O. Toyama

Prefectural University of Osaka

S. Ono

Prefectural University of Osaka

S. Tsuchihashi

University of Kobe

S. Hasegawa

Okayama University

H. Togawa

Doshiska University

Secretary:

K. Shimizu

M. Sasaki

E. Tanaka

November 20, 1968

Communications to the Editor should be addressed to Board of Editors. The Physico-Chemical Society of Japan, Faculty of Science, Kyoto University, Kyoto, Japan.

Business Correspondences should be addressed to: Secretary, The Physico-Chemical Society of Japan, Faculty of Science, Kyoto University, Kyoto, Japan.

Purchase Order should be addressed to: Maruzen Co., Ltd., Nihonbashi, Chuo-ku, Tokyo, Japan.

Published by

THE PHYSICO-CHEMICAL SOCIETY OF JAPAN

(Nippon Butsuri-Kagaku Kenkyu Kai)

Faculty of Science, Kyoto University, Kyoto, Japan

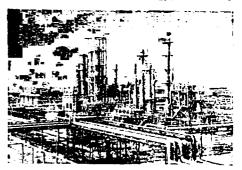
Printed by KAWAKITA INSATSU CO., Kyoto, Japan



Put all your titanium eggs in one basket?

To make optimum use of the advantages of titanium—superb corrosion resistance and highly desirable mechanical properties—titanium-lined and solid titanium equipment must be designed and manufactured with much care and more know-how.

Who could do the job better than a company that combines all the experience in steel and titanium metallurgy, machinery



design and manufacture, and testing techniques under one roof—in one basket, so to speak? Kobe Steel designs and produces a variety of devices and equipment either lined with or made completely of titanium, such as reactors, towers, heat exchangers, vessels, valves, pumps etc. for the petrochemical industry, electrolysis vats and electrodes for use in electrochemistry, and equipment for pulp, food, and synthetic textile processing.

Kobe Steel uses its own steels, its own titanium, its own know-how. That's why Kobe Steel can guarantee rigorous quality control at each and every production stage.

If you insist, we'll sell you just the titanium, too. Either way, it pays to get the details. Write to our nearest office.



♦ KOBE STEEL

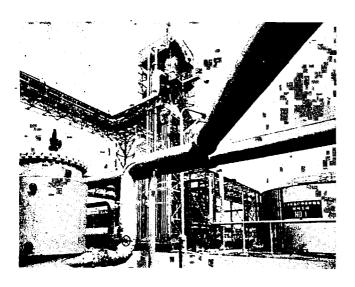
MACHINERY DIVISION

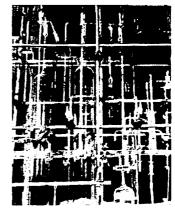
HEAD OFFICE: 36, 1-chome, Walknobama-tho, Fakial-ha, Kohe, Japan NEW YORK OFFICE: 110, Wall Street, New York, N.Y., 10005, U.S.A. DÜSSELDORF OFFICE: 10, Immermanatr., Dässeldorf, West Germany NEW DELHI OFFICE: 4th Floor, Alakabad Bank Bidg.
17, Parliament Street, New Delhi, India

KANEGAFUCHI now serves more than 100 industries varying from food to feed, soaps to textiles, electric wires to plastics.

KANEGAFUCHI's variety of products include industrial chemicals, polymers, oil & fat products and fermentation products. Such diversified operation ranks KANEGA-FUCHI a unique position in the industry.

KANEGAFUCHI's research activities which enabled successful achievement of today's products are continually producing a flow of new products to meet the challenge of tomorrow





PRINCIPAL PRODUCTS:

- KANEVINYL (PVC & copolymer, PVC compound)
- KANE ACE-S (ABS resin)
- KANE ACE-B (PVC modifier)
- KANE PEARL (expandable polystyrene beads)
- KANEKALON (modacrylic fiber)
- Electric wires & cables
- Caustic soda, Hydrochloric acid, KANECHLOR (transformer oil, heat transfer medium), Butanol, Acctone
- Bakery yeast, RNP (ribonucleo-protein), MIKAMY-Feed (animal feed additives)
- Margarine, Shortening oil, Soap, Glycerine

KANEGAFUCHI CHEMICAL INDUSTRY CO, LTD.

14, 2-chome, Awazi-machi, Higashi-ku, Osaka, Japan

Cable address: CHEMIKANE

As specialists we have contributed to the world industries since 1924.

DAIKINFLUOROCHEMICAL PRODUCTS

FLUOROCARBON REFRIGERANTS

DAIFLON-11
DAIFLON-113
DAIFLON-12
DAIFLON-13
DAIFLON-115
DAIFLON-21
DAIFLON-22
DAIFLON-500
DAIFLON-112

FLUOROCARBON SOLVENTS

DAIFLON SOLVENT S-1, S-2, S-3

AEROSOL PROPELLENTS

DAIFLON Aerosol Propellents

FLUOROCARBON POLYMERS

DAIKIN PTFE

Polytetrafluoroethylene

DAIKIN PCTFE

Polymonochlorotrifluoroethylene

DAIFLOIL

Low polymer of monochlorotrifluoroethylene

FLUOROCHEMICALS

Anhydrous Hydrofuoric Acid

Aqueous Hydrofluoric Acid

Benzotrifluoride and its derivatives FRATOL Sodium monofluoroacetate

FUSSOL Monofluoroacetamide

For imformation about products write below address.

PAIKIN KOGYO CO., LTD.

Heab Office: Shin-Hankyu Bldg., 8, Umeda, Kita-ku, Osaka, Japan. Tel: Osaka 312-1201 CableAddress: DAIKINOKAY Tokyo Branch: Fuji Bldg., 5,2-chome, Yaesu, Chua-ku, Tokyo, Japan. Tel: Tokya 272-3211 Cable Address TKYDAIKINOKAY

ASAHI CHEMICAL INDUSTRY CO., LTD.

Capital: ¥ 20,402,000,000

President: KAGAYAKI MIYAZAKI

Head Office: 25, 1-chome, Dojima-hamadori, Kita-ku, Osaka, Japan Tokyo Office: 12, 1-chome, Yurakucho, Chiyoda-ku, Tokyo, Japan

Other Branch Offices: Nobeoka, Nagoya, Fukuoka, Mizushima, Fuji, Sapporo,

Fukui, Kanazawa, New York, Hamburg, Hong Kong, Taipei

Plants: Nobeoka, Fuji, Kawasaki, Sakanoichi, Wakayama, Matsudo Laboratories: Tokyo (Technical Research Laboratory)

Takatsuki (Textile Research Laboratory)

Asahi's history dates as far back as 1923 when the late Mr. Jun Noguchi, who was the first president of the company, erected a synthetic ammonia plant in Nobeoka, present site of the company's major plants. This is a memorable plant in that the first commercial production of synthetic ammonia in the world by the Casale process was successfully started at this plant.

Thereafter Asahi's production activity continued to expand, with the exception of the war years, into great many fields. Using ample electric power from its own power plants and standing on the firmly established basis that primary raw materials are available within the company, Asahi has been producing chemical fibers, synthetic resin, explosives, chemical fertilizers, chemical seasoning, industrial nitrocellulose and several scores of chemicals of ammonia, soda and chlorine derivatives.

This fact points up to Asahi's special feature as a chemical company. Asahi ranks first in the production of viscose rayon in Japan and its cuprammonium rayon capacity is largest in the world. Using acrylonitrile monomer produced by Sohio process at its Kawasaki plant, Asahi produces polyacrylic fiber "CASHMILON" by its own process. Production acrylonitrile monomer and of polyacrylic fiber is also the largest in

Japan. Asahi's chemical seasoning (monosodium glutamate) AsahiAji, MITASU, ranks second in output of similar chemical seasonings. Sun-Nitro, Asahi's unique chemical fertilizer, is building up for itself a spectacular sales. Asahi's industrial nitrocellulose and electrolytic soda production is the largest in Japan. Asahi is also at the top in production volume of all the explosives manufacturers in Japan. Recently Asahi launched into three new fields of operation, i.e. nylon 6, synthetic rubber polybutadiene "ASADENE" and new building material "HEBEL".

At present, Asahi's products are exported to 50 different countries. Export of the process is also making headway. Worthy of mention in this connection is the export of viscose rayon manufacturing techniques to the Baroda Rayon Corporation, India, and Dawood Industries Limited, Pakistan, and of polyacrylic fiber manufacturing techniques to ANIC S. p. A., Italy. Through all these activities, the excellence of Asahi's techniques is highly evaluated.

Asahi now has many powerful affiliates, including Asahi-Dow Limited and Shin Nihon Chemical Industry Co., Ltd. and is proceeding on the road to further growth as a multiple-purpose chemical company.

NTK STAINLESS STEEL

Phippon METAL INDUSTRY CO., LTD.

Head Office: New Tokyo Bldg., 2-4, Yuraku-cho, Chiyoda-ku, Tokyo. Japan. Cable Address: NIKKINKO TOKYO

Branches: OSAKA - Iyo Bldg., 41, 4-chome, Minamihon-machi,

Higashi-ku, Osaka.

NAGOYA - Green Bldg., 18-16, 1-chome Nishiki-cho, Naka-ku, Nagoya.

CoupleSwan



NTK STAINLESS STEEL



Shirts with TEIJIN Tetoron fiber can handle the unexpected

You don't have to worry if the shirt and blouse contain TEIJIN Tetoron polvester fiber. For TEIJIN Tetoron creates a fiiber that washes easily, dries quickly, is wrinklefree and never TEIJIN Tetoron shirt and blouse fabrics are a needs morethan a touch of the iron.

Today's busy men and women are quickly learning to appreciate the benefits of TEIJIN Tetoron (polyester fiber). New shirts and blouses

with TEIJIN Tetoron in the fabric are truly wash-and-wear. White shirts stay whiter (they don't turn yellow) and colours stay brighter.

blend of Tetoron and cotton. Remember the TEIJIN Tetoron name. It's your guarantee of quality from Japan's pioneer synthetic fiber manufacturer.



Teto: POLYESTER FIBRE

TEIJIN TEIJIN LIMITED

NEW YORK OFFICE: 80 Pine St., New York, N.Y. 10005, U.S.A. Tel. WHitehall 4-3280 Cable Address: NYTEIJIN NEWYORK Telex: 222538 (TEIJINNY) OSAKA HEAD OFFICE: 1 Umeda, Kita-ku, Osaka, Japan Cable Address: TEIJIN OSAKA



Single crystals of HORIBA., offered as complete products ready to use which are free from impurity absorption, have aquired worldwide reputations.

Our scintillators, such as NaI (Tl), CsI (Tl) or CaI₂ are also credited and used internationally by the nuclear scientists, for the established qualities.

	NaCl	KCl	KBr	ΚI	LiF	AgCl	KRS-5*	KRS-6*	CsI
Limit of transparancy (microns)	~15	~21	~27	~31	~6	~30	~40	~34	~70
Refractive index:	1.555	1.498	1.559	1.667	1.394	2.071	2.629	2.336	1.987
Solubility:"	35.7	28.5	53.5	127.5	0.27	8.9 × 10 ⁻⁵	0.02	0.32	44
Specific gravity: gr/cm ³	2.16	1.59	2.75	3.13	2.64	5.56	7.2	7.19	4.53
Melting point: *C	801	776	730	680	843	455	415	424	621
Maximum diameter:	120	120	120	120	100	60	60	60	60
Maximum height:	100	100	100	70	60	100	60	100	100

- KRS-5 is a compound single crystal of TII and TIBr, and KRS-6 is a compound single crystal of TICl and TIBr.
- ** g/100 gr water at normal temperature.

HORIBA, Ltd.

Head office & Factory: Miyanohigashi-machi,

Kissyoin, Minami-Ku, Kyoto Tel: (075) 313-8121

Tokyo branch office:

No. 2-18, Nishihatchobori, Chuo-ku, Tokyo Tel: (03) 552-7661