

Vol. 48, 1978

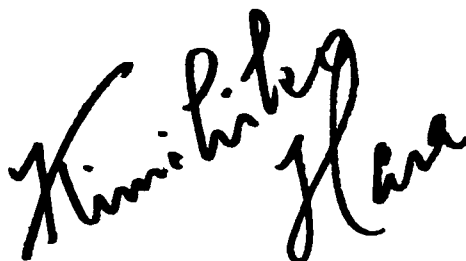
No. 1

# THE REVIEW OF PHYSICAL CHEMISTRY OF JAPAN

Founded in 1926

## CONTENTS

<b>Masaru Hongo and Hiroji Iwasaki</b> : Viscosity of Hydrogen and of Hydrogen-Ammonia Mixtures under Pressures .....	1
<b>Toshiharu Takagi</b> : Ultrasonic Velocity in Binary Mixtures under High Pressures and Their Thermodynamic Properties I, Binary Mixture for Nitrobenzene-Aniline .....	10
<b>Toshiharu Takagi</b> : Ultrasonic Velocity in Binary Mixtures under High Pressures and Their Thermodynamic Properties II, Binary Mixtures for Benzene-Toluene and Benzene- <i>o</i> -Xylene .....	17
<b>Izumi Ishihara</b> : The Effect of Pressure on the Complex Formation of Cobalt (II) and Nickel(II) Bromides in Acetone Solution.....	27
<b>Hisayuki Inoue, Kimihiko Hara and Jiro Osugi</b> : Effect of Pressure on Ionization of Triethylamine in Methanol .....	44
<b>Sefton D. Hamann</b> : The State of Ionic Micelles at High Pressures.....	60



THE PHYSICO-CHEMICAL SOCIETY OF JAPAN

# THE REVIEW OF PHYSICAL CHEMISTRY OF JAPAN

(Butsuri-Kagaku no Shinpo)

Found in 1926

**President :** Wasaburo Jono

**Members of Council :**

Michio Okamoto (Chief)

Jiro Osugi

Ryozo Goto

Renpei Goto

Eiji Suito

Hiroyuki Hatano

**Board of Editors :**

J. Osugi (Chief) *Kyoto University*

R. Goto (Associate) *Kyoto Sangyo University*

E. Suito ( " ) *Maizuru Technical College*

S. Shida *Yokohama University*

H. Teranishi *Kyoto Technical University*

K. Suzuki *Ritsumeikan University*

K. Kuwata *University of Osaka*

S. Seki *University of Osaka*

R. Fujishiro *Osaka City University*

T. Hayakawa *Prefectural University of Osaka*

Y. Kubokawa *Prefectural University of Osaka*

S. Tsuchihashi *Osaka Institute of Technology*

T. Makita *Kobe University*

K. Monobe *Okayama University*

K. Shimizu *Doshisha University*

H. Togawa *Baika Women's College*

**Secretary :**

M. Sasaki

K. Hara

M. Nakahara

Y. Kanou

August 20, 1978

**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**

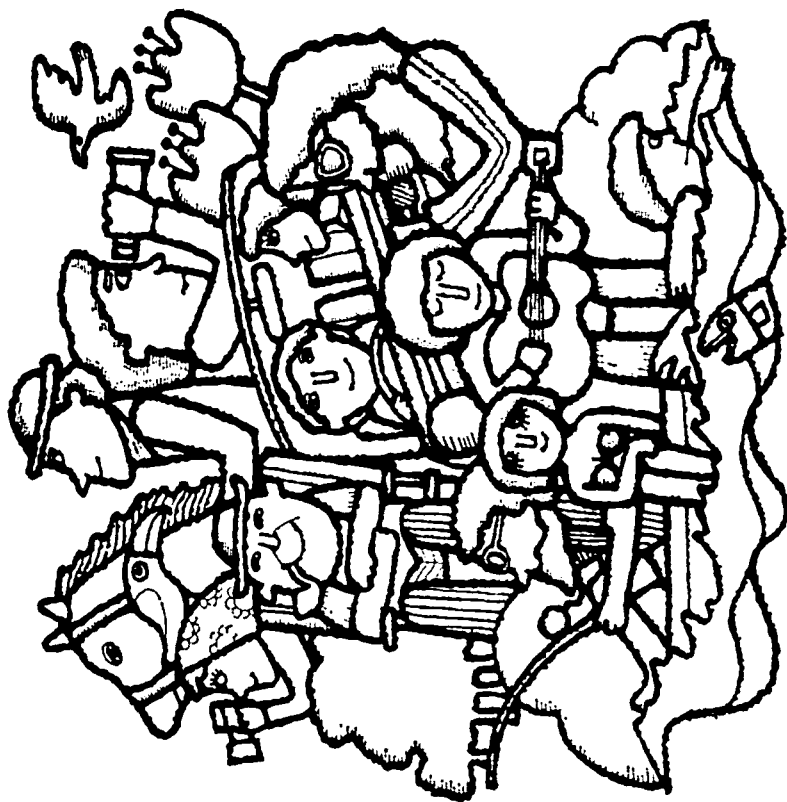
(Nippon Butsuri-Kagaku Kenkyu Kai)

Faculty of Science, Kyoto University, Kyoto, Japan

Printed by KAWAKITA PRINTING CO., LTD., Kyoto, Japan

**We serve.....  
Many peoples,  
Many lands,  
Many ways.**

**SYNTHETIC RESINS & PLASTICS  
INDUSTRIAL CHEMICALS  
FERTILIZERS  
DYESTUFFS  
AGRICULTURAL CHEMICALS  
MEDICINES  
CONSTRUCTION AND BUILDING  
MATERIALS**



**MITSUMI**  
**TOATSU**



**MITSUMI TOATSU CHEMICALS, INC.**

2-5, Kasumigaseki 3-chome, Chiyoda-ku, Tokyo, Japan

Cable: "MITSUMI TOATSU TOKYO"

Telex: Call No. 0222-3622 Answer Back Code (MTCHEM J)

**Example of Application with  
EMAX-1000 + SEM**



Photo 1 : 700 fold enlargement of an IC. The lower part shows the line analysis of Al. The electron Beam is scanned over the line (scanning time: 80 sec.).



Photo 2: The plan analysis of Photo 1 showing Al distribution.



Photo 3: Background is removed by contrast enhancer.

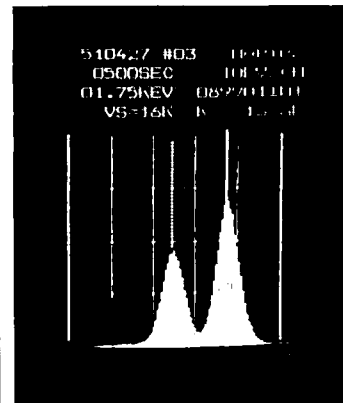
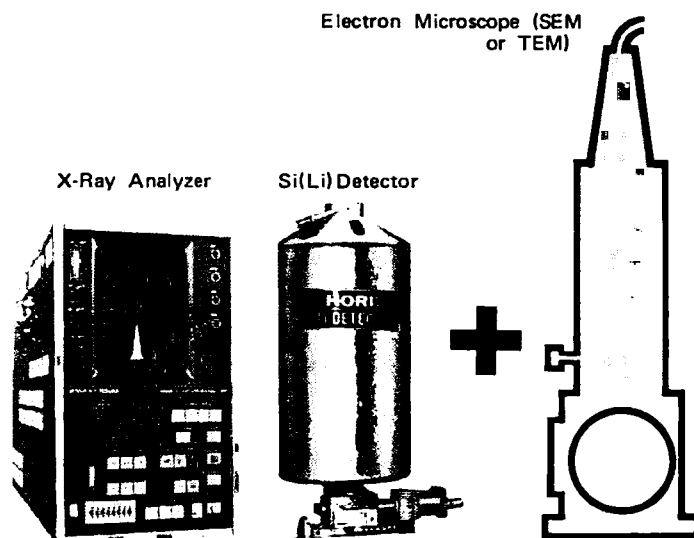


Photo 4: The X-ray analysis of the area shown in Photo 1. The brighter peak is the window-set Al. The adjacent peak is Si.

**Simultaneous qualitative analysis of  
multi-elements ( $^{11}\text{Na}$  -  $^{92}\text{U}$ )  
in a few tens of seconds.**



## X-ray Micro-Analysis System

**HORIBA MODEL EMAX-1000 SERIES  
X-RAY ENERGY DISPERSIVE ANALYZERS**

Each of HORIBA Model EXAM-1000 SERIES X-RAY ED ANALYZER for X-ray micro-analysis is a system for simultaneously, speedily and easily analyzing a multiple number of elements of a substance in a small area, by assembling it together with your electron microscope of SEM or TEM type. Extremely reliable. No personal error. Non-destructive. Consists of a high-resolution Si(Li) X-Ray Detector, a Pulse-Height Analyzer and a Video Display.

### MAIN APPLICATIONS

Qualitative analysis in the fields of metal and mineral industries, chemical industries and electronic industries.  
Fixing the elements in biochemical and bio-assay studies.

Objects: Characteristic X-rays of elements from  $^{11}\text{Na}$  (sodium) to  $^{92}\text{U}$  (uranium).

System of Measurement:  
Energy-Dispersive Method by Si(Li) X-Ray Detector.

Energy Resolution:  
Less than F.W.H.M. 162eV  
(MnK $\alpha$  Line 5.9keV, 1000 cps)

A group of specialists in HORIBA, Ltd. also offers an engineering service encompassing an overall system in order to maximize the performances of your X-ray analyzer system.

**HORIBA**

**HORIBA, Ltd.**

Head Office:  
Miyano Higashi, Kisshoin, Minami-ku, Kyoto,  
Japan  
Phone : (075) 313-8121  
Cable Add.: HORIBA KYOTO / Telex: 5422130

# KANEKA's

products and technologies shall be at your service

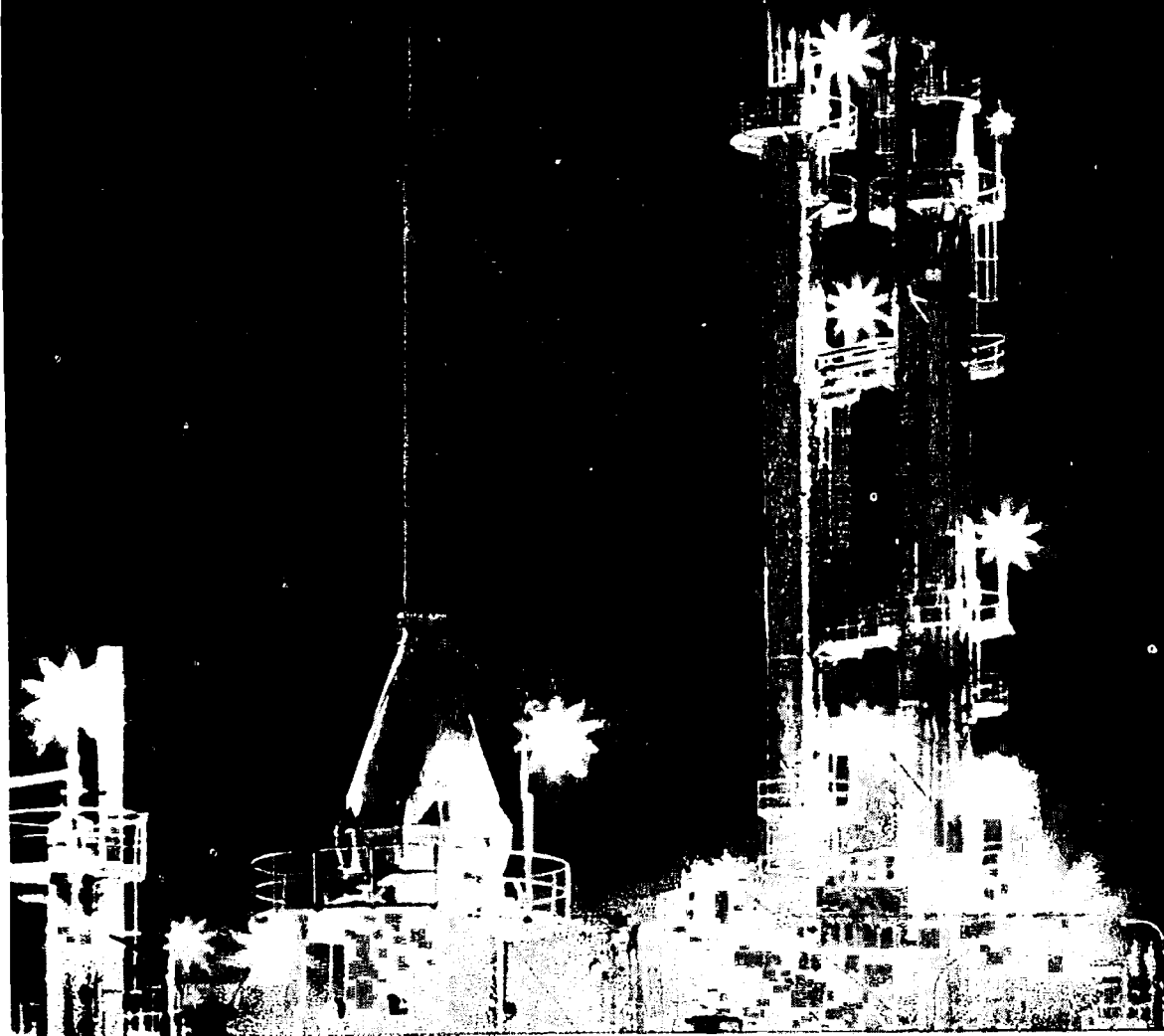
KANEKA has now firmly secured its leading position in Japan's chemical industry, and enjoys a high international reputation not only for its capability of offering unique, high-quality products in quick succession but also for its establishment of technical know-how in various field of technology. KANEKA's unique, high-quality products are as follows... "Kanealon," a self-extinguishing modacrylic fiber and is booming for its suitability and nonflammability for carpets, curtains and wigs. "Kane-Ace B," PVC modifier, is now in brisk world-wide demand. "PVC Dispersion Resin," "Heat Resistant PVC," "Expandable Polystyrene," and so on. A variety of epochal projects are now under way at our 10 laboratories far ahead in the same field both at home and abroad.

- \* KANEKA's per capita sales and profit are ranked as one of the highest among all chemical manufacturers in the world, thanks to our very high productivity.
- \* KANEKA's products have, for the most part, originated in its own laboratories.
- \* 55% of KANEKA's products have been developed on its hands for the first time in Japan.

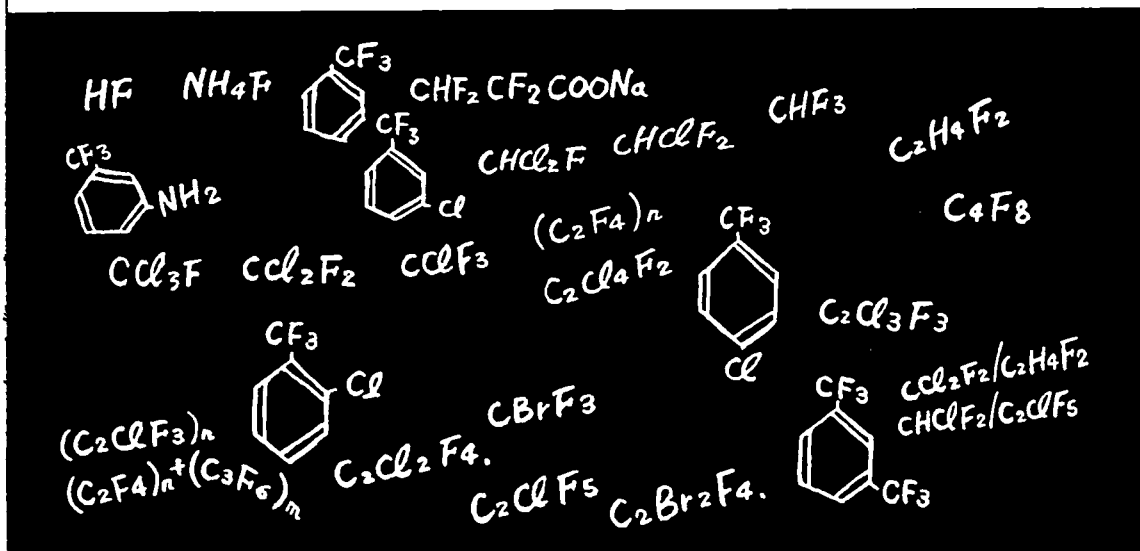
## KANEKA

For further details, please write to:  
**KANEGAFUCHI CHEMICAL IND. CO., LTD.**

Head Office: (Asahi Shinbun Bldg.) 2-4, 3-chome, Nakanoshima, Kita-ku, Osaka, Japan  
Phone: Osaka (06) 208-6218  
Tokyo Office: (Akasaka Center Bldg.) 3-12, 1-chome, Motoakasaka, Minato-ku, Tokyo, Japan  
Phone: Tokyo (03) 405-1011  
Kaneika America Corporation: 1251 Avenue of the Americas, New York, N.Y. 10020 U.S.A.  
Phone: (212) 581-6412  
Europe Office: Wetstraat 34 (rue de la Loi 34), 1040 Brussel, Belgium  
Phone: (02) 5139465/5137876  
Kaneika Belgium N.V.: Nijverheidsstraat 19, 2431 Westerlo-Oevel, Belgium  
Phone: (014) 214941-214945



# Tell us about how you're using fluorine compounds.



Fluorine compounds have many unique qualities. But their usages today are only the beginning; the best is yet to come.

DAIKIN is a total maker of fluorine compounds. Our series of them has been developed from Fluorspar as its basic material. And we've learned a lot along the way.

So the next time you discuss fluorine compounds, think of DAIKIN—the company with all the answers. Answers we're anxious to share.

## DAIKIN Fluorochemicals

DAIKIN KOGYO CO LTD

Head Office: Shin-Hankyu Bldg., 12-39, Umeda 1-Chome, Kitaku, Osaka, Japan

Phone: Osaka (06) 346-1201 Telex: 523-3844

# KURARAY HOLLOW FIBER MEMBRANES FOR A SUPER FINE FILTRATION SYSTEM AND A DIALYSIS SYSTEM

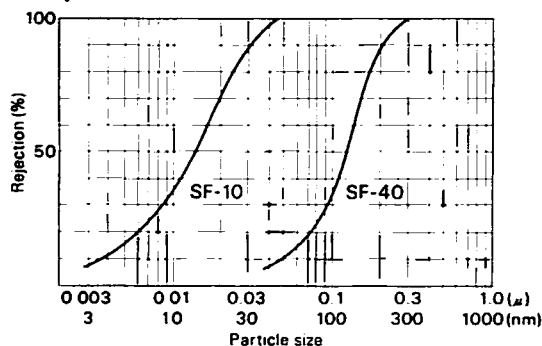
By virtue of the hollow fiber of polyvinyl alcohol, the main features of these membrane systems are :

- Excellent resistance to chemicals ; such as acids, alkalis, and most solvents
- Excellent resistance to microbial attacks
- Large membrane area per a single module
- Easy handling for assembling and disassembling of a module

## KURARAY SUPER FINE FILTER

**Performance** (USP 4.073.733)

### ● Rejection



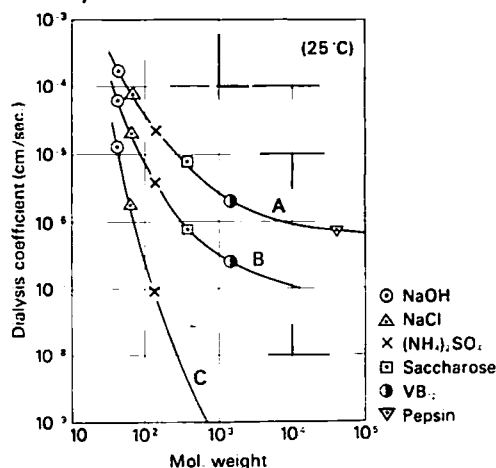
### Applications

- Removal of bacteria, yeasts, and suspended solids from water, syrup, fermented prod., in food industry
- Condensation of latex and emulsion
- Production of sterile and dustless water
- Prefiltration of sea water and waste water for reverse osmosis

## KURARAY HOLLOW FIBER DIALYZER

**Performance** (USP 4.071.454)

### ● Dialysis coefficient



### Applications

- Recovery of caustic soda from the used steeping liquor in viscose rayon process
- Removal of salts from polypeptides, amino acids, enzymes, antibiotics, hormones, etc.

KURARAY is now offering these membrane systems in various sizes, from a small one for laboratory testing to a large one for commercial production.

For further details, please contact us immediately.

**KURARAY CO., LTD.**

Project Development Department, 12-39, 1-Chome, Umeda, Kita-ku, Osaka, 530, JAPAN





# Like the goose that laid the golden eggs, Asahi Kasei is producing many things for your needs.

To make life better for everyone, Asahi Kasei produces all kinds of fibers and filaments to make the clothes you wear . . . draperies, carpets, wall coverings, blankets . . . tire cords for your automobile. We're in the food business with natural food flavoring and seasoning . . . frozen foods like hamburgers and meat balls. Skyscrapers use Asahi autoclaved lightweight concrete. We care for your health with medical

equipment, medicines, artificial kidneys. Asahi Kasei products also include plastics of all kinds, synthetic rubber, fertilizers, starting materials and intermediates, ion exchange membranes for a non-polluting method of producing caustic soda, photosensitive resins for the printing industry. Our research engineers are working on more new products to make your life easier and happier.



## Asahi Chemical Industry Co., Ltd.

Tokyo Head Office: Hibiya-Mitsui Building, 1-2, Yuraku-cho 1-chome, Chiyoda-ku, Tokyo, Japan

Tel: (03) 507-2730 Telex: 222-3518 (BEMBRG J) Cable: ASAHIKASEI TOKYO

Osaka Head Office: Shin-Osaka Building, 25-1, Dojima Hamadori 1-chome, Kita-ku, Osaka, Japan

Tel: (06) 347-3111 Telex: 523-3811 (BEMBRG J) Cable: BEMBRG OSAKA