

Glasses containing various amount of trivalent cerium ion ( $20\text{K}_2\text{O}$ ,  $10\text{BaO}$ ,  $70\text{SiO}_2$ ,  $0.1\text{CeO}_2$ , and  $0 \sim 0.2$  Si (mole %)) were first exposed to  $\gamma$ -radiation until they were colored to the same degree, and then, the fading of their color occurred with the lapse of time was measured. The content of  $\text{Ce}^{3+}$  ion in these glasses was also measured by the spectrophotometric method in order to obtain a relation between its content in the glasses and the fading velocity of their  $\gamma$ -ray induced color. The result showed that the higher the content of  $\text{Ce}^{3+}$  ion in the glass is, the higher the fading velocity of its color is. On the basis of this result and the results of the spectrophotometric studies on the cerium-containing glasses so far made by the authors (*J. Ceram. Assoc. Japan*, **68**, 132; 169 (1960)), the authors gave their view on the role of  $\text{Ce}^{3+}$  ion in preventing the  $\gamma$ -ray induced coloration of glass: Being excited by  $\gamma$ -ray irradiation, oxygen ions in glass loose some of their electrons. The  $\text{Ce}^{3+}$  ions give their weak-bonded 4f-electrons to the oxygen ions, thus preventing the formation of V-center like defects in glass. At the same time, the  $\text{Ce}^{3+}$  ions, now holding positive holes as the result of their lending their 4f-electrons to the oxygens, catch the ionized electrons that would be trapped or were already trapped by oxygen ion vacancies, thus preventing the formation of F-center like defects in glass. The total function of the  $\text{Ce}^{3+}$  ion in glass under  $\gamma$ -ray irradiation is, therefore, the recombination of the positive holes and the ionized electrons, thus preventing the formation of color centers.

**Some considerations on the non-similar changes of the void spaces produced by the thermal expansion of refractory bodies.** Susumu Nagasaki, Akira Watanabe, Kazuhiro Yoshizaki and Kaoru Umeya. *Zairyo Shiken*, **11**, 510 (1962), in Japanese.

**Studies on the thermal cracks of the refractory clay bodies produced in the low firing temperature range.** Susumu Nagasaki, Akira Watanabe, Kazuhiro Yoshizaki and Kaoru Umeya. *Zairyo Shiken*, **11**, 567 (1962), in Japanese.—Some fractures or cracks of the refractory clay bodies generated in the low firing temperature range were observed, and the relation between the thermal cracks and the packing of the material powders were investigated. The results were: (1) the original packing characteristics were changed remarkably by the thermal expansion produced in the bodies during heating procedure, but the effects in the cooling period were not remarkable. (2) The fractures of the bodies produced in the heating period were also affected by the blending of the component powders. Cracks were generated by poor blending. (3) Poor blending, however, produced good packing of the material powders in the heating procedure. Coarse constituents produced also good packing of the powder in the heating period. (4) When Roseki powder were used as the coarse constituent and clay powder as the fine one, the resultant composition was quite proof against producing the non-similar changes of the void spaces.

## Physical Chemistry

**Viscoelastic properties of bentonite pastes.** Hiroshi Aida, Tetsuya Hanai and Remppei Gotoh. *Nippon Kagaku Zasshi*, **83**, 536 (1962).—See, this Bulletin, **40**, 404 (1962).

**Dielectric properties of emulsions. IV. Dielectric behaviour of nitrobenzene-in-water emulsions.** Tetsuya Hanai, Naokazu Koizumi and Rempei Gotoh. *Kolloid-Z.*, **184**, 143 (1962).—The theoretical predictions concerning the dielectric dispersion due to the interfacial polarization are verified experimentally for the emulsions of the O/W type. Dielectric constants and electrical conductivities of nitrobenzene-in-water emulsions (O/W type) at rest and under shear were measured at higher concentrations up to 95% and at frequencies ranging from 20cps. to 5mc. No appreciable change of the dielectric constant and the conductivity of emulsions was observed under the rate of shear up to 40 sec<sup>-1</sup>. The electrode polarization was found below 10 kc. At high frequency range above 30 kc., striking dielectric dispersions due to the interfacial polarization were observed in accordance with the prediction from author's theory. The limiting dielectric constants at high frequencies are expressed well by the Bruggeman equation. The data are discussed in the light of the previous theories on the interfacial polarization.

**A low-frequency selective amplifier.** Naokazu Koizumi and Tetsuya Hanai. *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 188 (1962).

**Dielectric constants of emulsions.** Tetsuya Hanai, Naokazu Koizumi and Rempei Gotoh. *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 240 (1962).

**Effect of adjacent groups on the symmetrical CD<sub>2</sub> deformation frequencies.** Tohru Takenaka. *Nippon Kagaku Zasshi*, **83**, 267 (1962).—See, this Bulletin, **40**, 191 (1962).

**Effect of adjacent group on the rocking frequencies of methyl group.** Tohru Takenaka and Rempei Gotoh. *Nippon Kagaku Zasshi*, **83**, 997 (1962).—See, this Bulletin, **40**, 405 (1962).

**Inductive effect of adjacent groups on the symmetrical deformation and the rocking frequencies of methyl groups.** Tohru Takenaka and Rempei Gotoh. *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 272 (1962).

**Epitaxial growth of condensed aromatic polycyclic compounds.** Eiji Suito, Natsu Uyeda, Michio Ashida, *Nature*, **194**, 273 (1962).—The meridian fiber periods and the interplanar spacing are reported for Cu- and Pt-phthalocyanine films which were vacuum evaporated on a cleavage surface of muscovite crystal. The existence of an unstable  $\alpha$ -phase of Pt-phthalocyanine is also reported.

**The anomalous diffraction contrast on (111)-face of lamellar single micro-crystal of colloidal gold.** Eiji Suito and Natsu Uyeda. *J. Phys. Soc., Japan*, **17**, Suppl. B-11, 217 (1962).—The anomalous network pattern highly contrasted by diffraction effect has been observed on flaky (111) habit surfaces of single micro-crystals of colloidal gold by the transmission electron microscope. The characteristic point of the pattern is the direction of the striation making up the boundary line of hexagonal domains of the network pattern. The striations run in parallel to (11 $\bar{2}$ ), (1 $\bar{2}$ 1) or

(2 $\bar{1}1$ ) axes, which are quite different from those striations appearing on the surface of single-crystalline thin film of f.c.c. lattice assuming (111) orientation caused by lattice defects included in another three kinds of ( $\bar{1}11$ ) planes. The dark field images of the same pattern show that the squamous pattern is also caused by diffraction effect owing to the microstructure of the crystal including various lattice defects, the origin of which seems to have a close relation to the growth mechanism of the crystal itself in the solution.

**Infrared studies of rubber-filler system. I. Infrared absorption spectra of inorganic fillers.** Eiji Suito and Masafumi Arakawa. *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 291 (1962).

**Infrared studies of rubber-filler system. II. Identification of rubbers compound with fillers by infrared absorption spectra.** Eiji Suito and Masafumi Arakawa. *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 300 (1962).

## Polymer Chemistry

**Über den Lösungszustand des Polyvinylalkohols in Wasser. 1. Mitt. Metastabiler Zustand der Lösung.** Togoro Matsuo und Hiroshi Inagaki. *Makromol. Chem.*, **53**, 130 (1962).—An gelösten, unter verschiedenen Polymerisationsbedingungen hergestellten Proben von Polyvinylalkohol wurden Streulichtmessungen ausgeführt. Es wurde besonders die Wirksamkeit von verschiedenen optischen Reinigungsmethoden berücksichtigt. Die Zimm-Diagramme für drei von fünf Proben zeigten anormale Kurven, was darauf hinweist, daß noch in verdünnter Lösung Mikrogelteilchen vorhanden sind, während die anderen zwei Proben normale Kurven aufwiesen. Diese ermöglichen, das Molekulargewicht des Gelösten zu bestimmen. Durch Stehenlassen der Lösung bei 30 °C trat eine zeitliche Zunahme der Streuintensität auf, die wahrscheinlich durch Bildung weiterer Mikrogelteilchen verursacht wird. Die Aufbewahrung bei 0 °C ergab jedoch keine merkliche Veränderung. Durch Erhitzen der Lösung auf 100 °C konnten die Mikrogelteilchen nur zum Teil zerlegt werden. Das besagt, daß die Teilchen aus einem parakristallinen und einem amorphen Bereich bestehen und daß nur der letztere Anteil bei 100 °C desintegriert wird. Um den Zusammenhang zwischen der Kristallinität einer Probe und deren Lösungsverhalten zu erkennen, wurde ein Präparat im festen Zustand bei verschiedenen Temperaturen vorbehandelt. Der Einfluß dieser Vorbehandlung auf den Lösungszustand wird im Zusammenhang mit der Röntgenkleinwinkelstreuung im festen Zustand diskutiert.

**Über den Lösungszustand des Polyvinylalkohols in Wasser. 2. Mitt. Molekulargewichtsbestimmung durch Streulichtmessungen.** Togoro Matsuo und Hiroshi Inagaki. *Makromol. Chem.*, **55**, 150 (1962).—Unter der Annahme, daß sich Polyvinylalkohol (PVA) bei 80 °C molekulardispers in wäßrige Lösung bringen läßt, wurde das Molekulargewicht für einige Fraktionen von PVA durch Streulichtmessungen