

ABSTRACTS

**Relationships between Thermal Expansion and Packing
of Particles of Refractory Clay Bodies**

Susumu NAGASAKI, Akira WATANABE, Kazuhiro YOSHIKAWA
and Kaoru UMEYA

Yogyo Kyokaiishi (Journal of the Ceramic Association, Japan), **69**, 323 (1961)

Thermal expansion at temperatures up to 1000°C was determined for pressed powders of fire clays, stony substances, and their mixtures. The thermal expansion curves obtained for their mixtures did not agree with those calculated from those of their components by assuming the additive relationship. A mechanism which explains this result was described.

Polymerization of Ketene and Diketene

Ryohei ODA, Sunao MUNEMIYA and Masaya OKANO

Makromolekulare Chemie, **43**, 149 (1961)

A polymer of the β -diketone type was obtained by boron trifluoride catalyzed polymerization of ketene or diketene, though its molecular weight was not so high. Its structure was mainly ascertained by infrared analysis.

**New Addition Reactions. (I)
Reaction of Epoxides with Ketene**

Ryohei ODA, Sunao MUNEMIYA and Masaya OKANO

Journal of Organic Chemistry, **26**, 1341 (1961)

By the addition reaction of 1,2-epoxides with ketene using boron trifluoride as catalyst, some γ -substituted γ -butyrolactones were obtained in about 10% yield based on epoxides.

Polymerization of Acetaldehyde

Junji FURUKAWA, Takeo SAEGUSA and Hiroyasu FUJII

Bulletin of the Japan Petroleum Institute, **3**, 33 (1961)

It has long been known that acetaldehyde is polymerized to give amorphous polyacetaldehyde when the monomer is frozen. In this method freezing of the mon-

ABSTRACTS

omer was an indispensable process.

Recently we found that alumina was a more effective catalyst for amorphous polymerization. Acetaldehyde was easily converted to high polymer without freezing of the monomer.

Furthermore, Natta *et al.* and ourselves succeeded respectively in the preparation of the crystalline polymer of aldehydes by organometallic compounds and metal alkoxide. The crystalline polymer is much less soluble in organic solvents than the amorphous one.

The mechanism of the stereoregular polymerization was considered in connection with several synthetic organic reactions which involve metal alkoxides and carbonyl compounds. The coordination complex of aldehyde to the metal alkoxide seems to play an influential role in the stereoregular polymerization.

Polymerization of Alkylene Oxides

Junji FURUKAWA, Takeo SAEGUSA and Teiji TSURUTA

Bulletin of the Japan Petroleum Institute, 3, 39 (1961)

A review of catalysts for the high polymerization of alkylene oxides was given, from which it was deduced that a metal-oxygen bond was an essential element of active species in most cases.

Then, two catalytic systems which were found in our laboratory were discussed. First, the active species of the system of diethylzinc and water was mentioned, and the reaction mechanism was suggested. The second system consists of an organometallic compound and an acidic oxide such as alumina or silica-alumina. These systems induce anionic polymerization of alkylene oxide and it can be assumed that adsorption of monomer on metal of the metal-oxygen bond plays an influential role both in activation of monomer and in controlling the stereoregularity.

Preparation of Crystalline Polyaldehydes

Junji FURUKAWA, Takeo SAEGUSA and Hiroyasu FUJII

Makromolekulare Chemie, 44, 398 (1961)

We found that some organometallic compounds and metal aldehydes including acetaldehyde, propionaldehyde and trichloroacetaldehyde (anhydrous chloral) to give crystalline polyaldehydes. Crystalline polyacetaldehyde was much less soluble in organic solvents than the amorphous one.

Active species of this polymerization was supposed to be metal alkoxides and the mechanism of polymerization was considered in connection with several syn-