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triethylaluminum gave a linear polyethylene (mol. wt. $51.0 \cdot 10^4$) and polypropylene (mol. wt. $22.9 \cdot 10^4$) and the overall energy of activation of the polymerization of ethylene by this catalyst was found to be 6.4 Kcal/mole. The effects of the composition and the temperature of calcination of the silica-alumina-titania were investigated, and some kinetic features of the catalyst were discussed.

In the polymerization of ethylene, this catalytic system is more active than the so-called Phillips catalyst (chromium oxide/silica-alumina) and the so-called Standard catalyst (molybdena-alumina), but less active than the Ziegler catalyst (i.e. $\text{TiCl}_4\text{-AlEt}_3$). The polyethylene produced by this catalyst has little branching and its molecular weight is comparable to that obtained by the Ziegler catalyst.

Polymerization of Propylene Oxide and Vinyl Compounds by Diethylzinc in the Presence of Cocatalysts

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Makromol. Chem., **40**, 64 (1960)

Elastic solid polypropylene oxide was obtained by the following binary systems as catalyst: diethylzinc-oxygen, diethylzinc-water, diethylzinc-methanol and diethylzinc-ethanol. Polymers obtained by the systems containing water, methanol and ethanol involved crystallizable fraction. Alkoxides of zinc play an important role in the polymerization with the systems containing oxygen, methanol and ethanol. The active component of the diethylzinc-water system was a yellow solid substance containing the structures, $\text{C}_2\text{H}_5\text{-Zn-O-Zn-}$ and $\text{C}_2\text{H}_5\text{O-Zn-O-Zn-}$. The diethylzinc-water catalyst obtained by dissolving the yellow solid substance in *n*-hexane was transparent in appearance, but was found to be heterogeneous in character. Vinyl compounds were also polymerized by these catalysts. Polymerization of vinyl compounds is considered to proceed according to a radical mechanism and that of propylene oxide to an ionic mechanism.

Infrared Spectrum and Structure of Polydiketene

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Makromol. Chem., **42**, 25 (1960)

Mercuric chloride polymerized diketene at low temperature. The molecular weight of the acetone-insoluble and dioxane-soluble fraction of the polymer was 1630.

From the alcoholysis of the polymer and the infrared spectrum of the polymer, the molecular structure of the polymer was considered to be the open chain polymer of vinylaceto- β -lactone. Consequently, the molecular structure of diketene

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was also believed to be vinylaceto- β -lactone, although the assignments of the five strong bands in the doublebond region still remain in question.

Stereoblock Polymer of Acetaldehyde

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Makromol. Chem., **40**, 226 (1960)

A stereoblock polyacetaldehyde consisting of amorphous and crystalline blocks was prepared by alumina which was modified by treatment with diethylzinc. The stereoblock polymer is less elastic than the amorphous one and its solubility lies between those of the amorphous polymer and of the crystalline one.

Stereoblock polymer was confirmed by comparing its infrared spectrum with those of the fractions obtained by the same procedure of separation of the mixture (1:1) of crystalline and amorphous polymers.