

## Selected Abstracts from *Yogyo-Kyokai-Shi*

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### Preparation of $\text{Pb}(\text{Zr},\text{Ti})\text{O}_3$ by Oxalate Method in Ethanol Solution (Part 1)

#### Investigation of Preparation Procedures

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$\text{Pb}(\text{Zr}_{x,3}\text{Ti}_{1-x,3})\text{O}_3$  (PZT) was prepared by calcining the oxalates which were co-precipitated from a reaction of metallic components in small amount of water with oxalic acid in large amount of ethanol. In the co-precipitation experiments, mixing procedures of two kinds of solutions and effects of additional titration with ammonia solution after oxalation were investigated. It was found that the addition of an aqueous solution containing metallic components to the ethanol solution of oxalic acid and subsequent addition of an ammonium solution were necessary in order to obtain highly dispersed fine-particulated PZT powders which have good crystallinity. These effects were confirmed by X-ray diffractometry, SEM observation, and measurements of particle size distribution. Calcination of thus obtained oxalate at 800°C for 2 h produced a mixed phase of PZT's of rhombohedral and tetragonal symmetries. The particle size was around 0.2  $\mu\text{m}$ . On the other hand, the calcination at 1100°C produced the tetragonal phase, of which the  $c/a$  value was 1.029, and particle size was around 1  $\mu\text{m}$ . [Received May 20, 1985]

### Sinterability of $\text{SiO}_2\text{-Al}_2\text{O}_3$ Powders Prepared by Spray Pyrolysis

#### — Effect of Chemical Composition —

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The  $\text{SiO}_2\text{-Al}_2\text{O}_3$  powders containing 68 to 78 wt%  $\text{Al}_2\text{O}_3$  were synthesized by spray pyrolysis technique to study their sinterability at 1630°-1650°C. The prepared amorphous powders were transformed directly to crystalline mullite by calcination above 980°C. When heat-treated at temperatures above 1500°C, corundum was detected in the powder composed of 78 wt%  $\text{Al}_2\text{O}_3$ . Densification of the silica-rich powder was accelerated by the formation of glassy phase, and the bulk