

**The Mechanical Structure and the Course of the
Formation of Calcined Silica-Alumina Gel**

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The formation of xero- or hydro-gel was studied electron microscopically. The course of the hydro-gel formation from the sol was observed to be as follows: (1) The spherical nucleus of hydro-gel is deposited in the sol. (2) Next, the yarn-shaped hydro-gel grows in a longitudinal direction and exhibits periodic growth (a layer pattern). (3) The growing yarn-shaped gels become cross linked with each other. (4) Thus, the hydro-gel bulk is formed and attains the form of a jelly.

The fine mechanical structure of the hydro-gel was transformed, by drying and calcining, to aggregates made of newly formed subparticles $10\text{--}10^2$ Å in diameter. However, the calcined xero-gel aggregates maintained the shape of the original hydro-gel particles.

The specific surface area and the pore nature (shape, volume, and radii) of the calcined xero-gel have been determined by the diameters and the state of aggregation of the subparticles.

It is concluded that the physical properties of calcined silica-alumina gel are determined by the mechanical structure of the original hydro-gel and by the conditions prevailing during its dehydration.

Received November 9, 1964.