KRATKA SAOPĆENJA SHORT COMMUNICATIONS

The Kinetics of the Formation of Aluminium Hydroxide by Seeding Sodium Aluminate Solutions with Hydrargillite Crystals.
III. The Effect of Coarse-Grained Seed

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We concluded from the fig. 2/c in our second report[1], that nucleation was caused only by fine particles and independetly from the coarser ones which played quite a passive role. We are presenting direct evidence for this statement.

Commercial alumina trihydrate was dry-sieved through a 270-US-sieve (openings cca 53 μ). To eliminate retained fines (about 3.7%) the sieved product was subjected to 10-fold sedimentation in a 0.005 *M* $Na_4P_2O_7$-solution. It was not difficult to wash out afterwards the pyrophosphate, because the crystals were very coarse.

The results of three seeding-experiments, comparable to those from fig. 2/c[1] except for the absolute absence of the fines, are represented in fig. 1 and 2. It can be noted in the first diagram that the decomposition-rate is small and constant, i. e. without usual rapid change at the beginning of the process. Cumulative undersize dispersity-curves of the seed and the products after 69 and

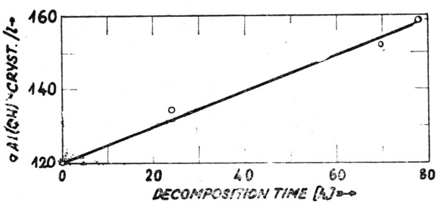

Fig. 1. The decomposition rate of aluminium hydroxide

77 hours decomposition-time are plotted in fig. 2. In the course of 24h-experiment a hard sediment of the coarsest particles was formed at the bottom of the vessel owing to the unsatisfactory mixing. For this reason the dispersity curve of this experiment was not included in fig. 2.

The precision of the Andreasen-pipette-method is low in the measured range of particle sizes. The microscope counting technique would permit the quantitative treatment of the results but even from the presented result several impotant qualitative conclusions can be drawn in the following way.

First, it is evident that new fine crystallites have not been formed, i. e. induced nucleation has been absolutely absent. Second, the growing effect of the particles is too small to be interpreted by agglomeration (intercrystallization). Thus, it remains to conclude that the crystallization of the solid-phase as verified from fig. 1 is an exclusive consequence of simple-crystal-growth.

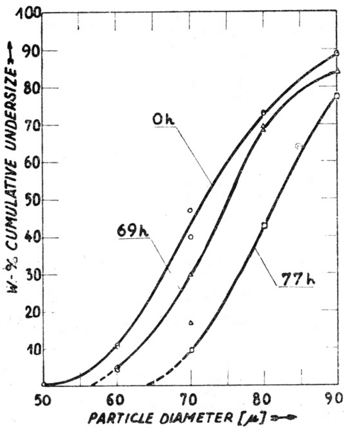

Fig. 2. Particle size cumulative distribution curves

We also tried to measure the dispersity of an artificial mixture of fine and coarse crystals (similar to that of the seed from the fig. 2/c[1]) dispersed in aluminate solution. Among few simple possibilities the following one has rendered satisfactory results: after the withdrowal from the Andreasen-pipette (at 25°C), the samples were filtered, washed, and ignited at about 1000°C for an hour. The results were expressed in miligramms of the weighed ignited product. A measurement in an aluminate solution of 1.83 caustic ratio ($Na_2O : Al_2O_3$) and a second one in a solution of 3.55 c. r. were performed. The Na_2O-concentration was the same as in our usual seeding-experiments.

The prepared mixture contained 9.1% of the fine (having 96% particles smaller than 10 μ), the coarse fraction being the same as in fig. 2 (Oh). 13.3 and 12.0% of fines was estimated by sedimentation in the two aluminate solutions, respectively. Apart from this results the same position of the inflection point in these curves and in the cumulative dispersity-curves measured in the usual way confirms also our statement given before.

REFERENCES

1. S. Maričić and I. Markovčić, *Arhiv kem.* **27** (1955) 41.

IZVOD

Kinetika stvaranja aluminijeva hidroksida cijepljenjem otopine natrijeva aluminata kristalima hidrargilita. III. Djelovanje grubozrnata cjepiva

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Cijepljenjem grubozrnatim cjepivom (v. sl. 1/Oh), iz kojeg su fine čestice bile potpuno uklonjene, kao i mjerenjem disperziteta umjetne smjese grubih i finih čestica u aluminatnim otopinama, potvrđen je raniji zaključak (loc. cit. 1, sl. 2/c), da su grube čestice u aluminatnoj otopini podvrgnute jedino prostom rastu, te da — ako su prisutne u manjoj količini i fine — izazivaju nezavisno od grubih, nukleaciju.

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