

Colloidal silica slurries preparation by ion exchange method for microelectronics application

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Nowadays it is more often required processing of semiconductor wafers with a microrelief which does not exceed atomic scales. That is the reason of the intensive research for the development of new methods for their processing and materials for this purpose. The suspensions should be homogeneous by phase and elemental composition, high stable, easy in obtaining and application, cheap and environmentally friendly. The lack of systematic reviews and little amount of publications on this problem is explained by commercial interests [1-2]. Among the silicic dispersions silica sols attract more attention than aerosol ones.

We have synthesized silica sols by ion exchange technology. The formation of nuclei of sol silica particles with the following growth of colloidal size particles occurred by adding an acid to a dilute solution of waterglass. Waterglass was diluted to a SiO₂ concentration of 3÷5 mass. % and passed through a column filled with ion-exchange resin: cation, anion exchanger and the mixture of them. The possibility of concentrating silica sols by evaporation and ultrafiltration were studied. Since silica sol is a dynamic system, this especially applies to freshly prepared silica sol, its particles undergo changes during their existence (Figure). The polymerization of silica in solution and the sols st

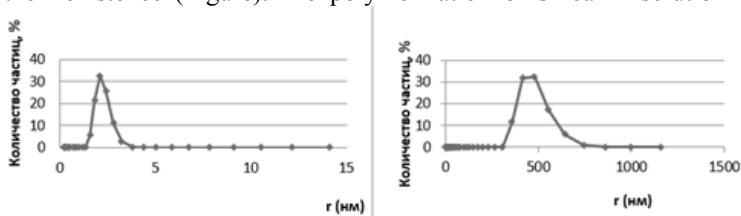


Fig. The particles size distribution of silica sol in 20 and 60 minutes after the preparation

References

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- [2] LUDOX® TM-40 colloidal silica [Electronic resource]: Technical Literature. – Mode of access: nathan.instras.com/documentDB/paper-190.pdf. – Date of access: 11.09.2020.