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DETERMINATION OF HIGH CONCENTRATION OF FLUORIDE IN GLASSES AND RAW MATERIALS

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The properties of optical glasses with high concentrations of fluoride, especially fluorophosphate glasses and fluoroaluminate glasses (concentration ranges 30 - 50 % of weight fluoride), strongly depend on variations in the concentration of fluoride. Therefore, the determination of fluoride in the glasses and raw materials is required as precise as possible.

For tests and calibration purposes, fluoride in NaF was determined by different methods. Highest precision resulted from the PbBrF-method.

In some cases, e. g. for AlF_3 , it was necessary for sample preparation to fuse with $\text{Na}_2\text{CO}_3/\text{K}_2\text{CO}_3$ or NaOH. Optimal parameters for fusion were evaluated by thermal analysis and test fusions.

For the separation of fluoride two kinds of apparatus for steam distillation were used and the conditions optimised. They contributed the main error to the methods of determination.

Potentiometric determination with a fluoride sensitive electrode with and without preceding separation of fluoride was complicated because of the attack of the electrode by complexing agents. This was overcome by using phosphate buffer solution or polishing the electrode with diamond paste.

The results of the determination of fluoride in raw materials and fluoroaluminate glasses and fluorophosphate glasses by means of the different methods applied are presented.