

GLI Method Summary

Determination of Total Fluorine by Oxygen Flask Combustion and Ion-Selective Electrode

Governing SOP: E9-3 Rev 15

Analyte: F

Summary

Fluorine can be converted to fluoride by combusting the sample in an oxygen flask with a known volume of ionic strength adjustment buffer as an absorbing medium using procedure G-54. An ion-selective electrode determines the fluoride content.

Instrument	Orion Fluoride Electrode (9409); Orion Reference Electrode (90-01 Single-Junction); Fisher Accumet AR25 Ion Meter
Preparation	Combust 1-200 mg of sample in an oxygen rich atmosphere using a heavy wall oxygen flask that contains a known amount of buffer solution. Sucrose is used as a combustion aid.
Calibration	Make working standard solutions from the stock NaF 1000 µg/mL solution in concentrations of 10, 5, 2, 1, 0.5 µg/mL for high level, and 2, 1, 0.4, 0.2, 0.1 µg/mL for low level;
Determination	Direct readout in mg/L using an ion meter.
Precision & Accuracy (p-0902)	RSD 1.22
Interferences	Boron, metals that form insoluble fluorides such as Ca, Ba, and La (these must be distilled), and Hydroxides.
Calculations	$\frac{[(\text{sample conc. } \mu\text{g/mL}) (\text{dilution factor}) - \text{*blank conc. } \mu\text{g/mL}] (\text{prep volume, mL})}{\text{Sample weight, g}} = \mu\text{g/g F}$ $\frac{[(\text{sample conc. } \mu\text{g/mL}) (\text{dilution factor}) - \text{*blank conc. } \mu\text{g/mL}] (\text{prep volume, mL})}{\text{Sample weight, mg} \times 10} = \% \text{ F}$

References

Baumann, E. W., *Anal. Chim. Acta*, 1968, 42(1), p. 127.

Frant, M. S., *Anal. Chem.*, 1968, 40(7), p. 1169.

ASTM D-1179-04, *Standard Test Method for Fluoride in Water*.

EPA 340.2

Other GLI Procedures

E9 *Fluoride in Water or Water-soluble Solids by Specific Ion Electrode*

E9-3A *Determination of Fluorine by Pyrohydrolysis and Ion-Selective Electrode*