NEW PROCEDURE OF ABSOLUTE PROTIUM CONTENT MEASUREMENT IN HEAVY WATER BY IR-SPECTROFOTOMETER METHOD

A. I. Grushko, O. A. Fedorchenko, V. D. Trenin

Infrared method has a good possibilities for isotopic heavy water analysis. But protium analysis in heavy water is a relative method of analysis, because heavy water in this case (without tritium) exists in three isotopic modifications. Therefore for the absolute analysis one needs to carry out the gauge of IR- spectrofotometer with the help of heavy water standard samples, in which the protium content was measured in other absolute way, for example, picknometric. And accuracy of the measurement will depend upon accuracy measurement of the standard samples. Moreover the rocedure of heavy water with a small protium content measurement by IR-method can have a considerable errors, caused by:
- different degree of heavy water dilution, when preparing the sample and the cell for the analysis;
- the water heating during the measurement;
- the appearance of microbubbles in the absorption place of the cell;
- the water dilution during measurement because of loss leaktightness of the cell and others.

A technique of absolute protium content measurement was developed founded on existing of peculiar points in a near and midlle IR-regions in which the relationship between absorbtion natural index and atom part of protium becomes linear [1]. The procedure of absolute protium content analysis was developed on this principle it. The procedure includes discovery of peculiar points, measurement error lowering up to necessary level at the expence of decrease or removal of the above-mentioned cause.

Procedure can be used for preparation of the heavy water standards and attestation of instruments for on-line isotopic heavy water analysis.

REFERENCES

1. *Grushko A.I., Fedorchenko O.A., Trenin V.D.* New procedure of protium absolute content measurement in heavy water by IR-spectrofotometer method. Preprint PNPI. In press..