

§13. A Simplified Method for Tritium Measurement in the Environmental Water Samples

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1. Abstract

We have been studying the measurement of tritium concentration in the environmental water samples these several years. Liquid scintillation counting with the electrolyte enrichment is the most popular method to measure the low-level tritium samples. The conventional procedure was however very complicated and took a lot of time. Then, we have developed a simplified and accurate procedure with the electrolysis enrichment¹⁾²⁾³⁾. By means of this procedure, we have been measuring tritium concentration of several samples for three years. Moreover, in order to shorten the required time keeping the accuracy, we have improved the procedure.

2. Experimental and Results

The measurement was carried out as follows;

SAMPLING ⇒ RO FILTRATION ⇒ ENRICHMENT ⇒ LS COCKTAIL MIXING ⇒ LS COUNTING

The measurement flow was the same with the previous one, but the enriching time and the LS counting time were shortened keeping the accuracy.

ENRICHMENT : 3 days → 2 days

LS COUNTING: 1,500 min → 1,000 min

To determine the tritium enrichment factor, the heavy water concentration was also measured before and after the enrichment using a very accurate density meter. The results were shown in Fig. 1.

1. All most all of the measured values were between 0.05 and 0.5 Bq/kg. The values were always slightly decreasing.

3. Conclusion

(1) The measurement time were successfully shortened keeping the accuracy.

(2) The values were 0.05-0.5 Bq/kg-water except vapor samples. The values were always slightly decreasing.

References

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- 2) Y. SAKUMA et al., J. Radioanalytical and Nuclear Chemistry, 255, No.2 (2003) 325.
- 3) T. KOGANEZAWA et al., Radioisotopes, 53, No.5 (2004) 277.

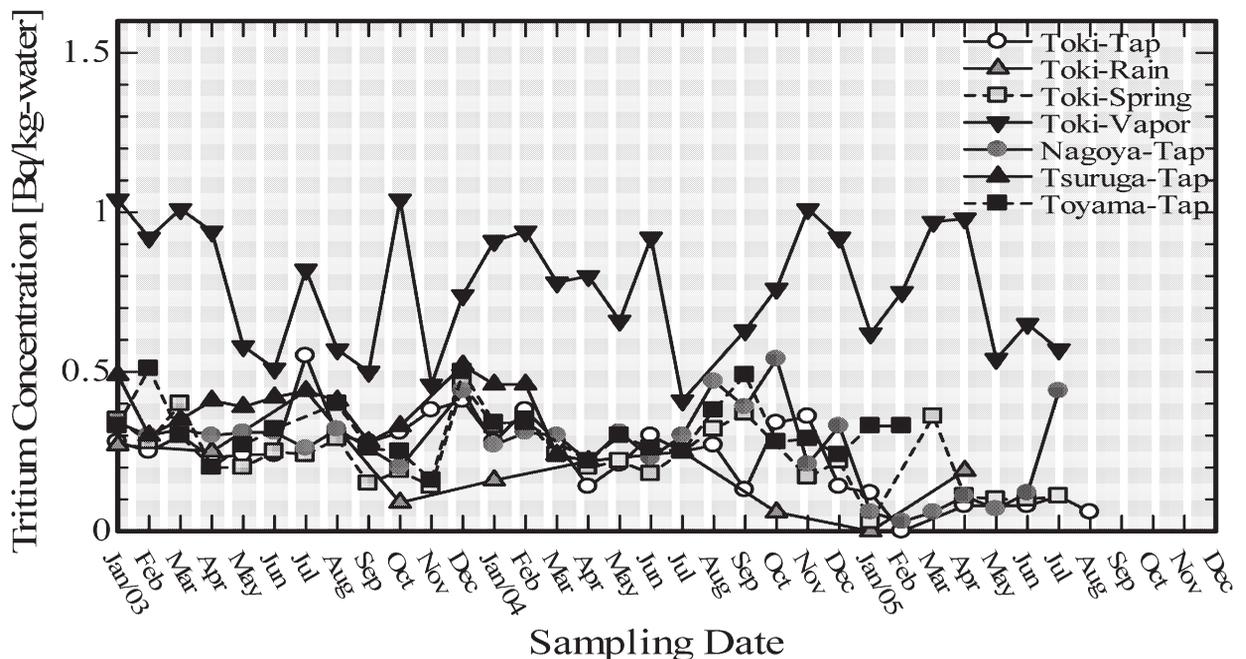


Fig. 1 Results of measurement.