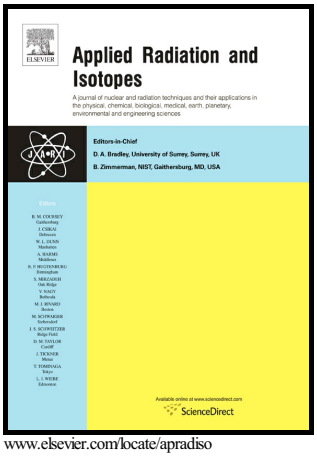
Method for organically bound tritium analysis from sediment using a combustion bomb

I. Vagner, C. Varlam, I. Faurescu, D. Faurescu, D. Bogdan, F. Bucura



www.elsevier.com/locate/apradiso

PII: S0969-8043(16)30688-1
DOI: http://dx.doi.org/10.1016/j.apradiso.2016.09.010
Reference: ARI7600

To appear in: *Applied Radiation and Isotopes*

Received date: 22 April 2016
Revised date: 23 August 2016
Accepted date: 8 September 2016

Cite this article as: I. Vagner, C. Varlam, I. Faurescu, D. Faurescu, D. Bogdan and F. Bucura, Method for organically bound tritium analysis from sediment using a combustion bomb, *Applied Radiation and Isotopes* http://dx.doi.org/10.1016/j.apradiso.2016.09.010

Method for organically bound tritium analysis from sediment using a combustion bomb

I. Vagner*, C.Varlam, I. Faurescu, D. Faurescu, D. Bogdan, F. Bucura

Tritium Laboratory, Institute for Cryogenics and Isotopic Technologies – ICSI, 4 Uzinei Street, 240050 Rm. Valcea, Romania
*Corresponding author. irina.vagner@icsi.ro

Abstract

The method consisted in combustion, using a Parr bomb type 1121, of a sediment - tritium free promoter mixture. The proper ratio sediment to promoter in our experiments was between 1:3 and 1:2, higher ratio resulting in unreliable results, due to incomplete combustion of the sample. The described method was used to measure the estuarine sediment sample from the 2nd International OBT Intercomparison Exercise, the average reported value being 163 ± 12 Bq kg^{-1} dry matter (k=2).

Keywords: *sediments, organically bound tritium, Parr bomb, liquid scintillation counting*

1. Introduction

Tritium and radiocarbon are currently the two main radionuclides that might be discharged in water bodies by the industry and particularly by heavy-water reactors, such as CANDU reactors. Tritium widely integrates into the water cycle and follows the water mass dynamics but it may also be integrated for long term into the organic pool, persisting in aquatic environment according to the recycling rates of organic matter (Eyrolle-Boyer et al., 2015). The experimental data indicated a time lag between