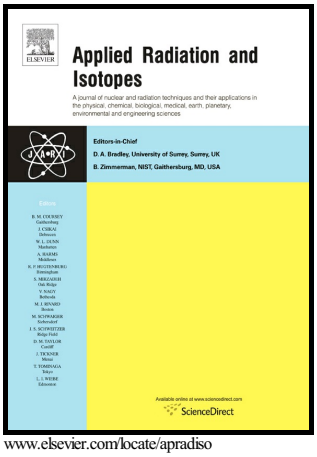

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Experimental Evidences of ^{95m}Tc Production in a Nuclear Reactor

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Abstract

^{95m}Tc has been identified as by-product in some solutions of ^{99m}Tc obtained by irradiation of molybdenum trioxide in a reactor neutron flux. The characterization was carried out using both measurements by gamma spectrometry and half-life determination. The possible ways that lead to the ^{95m}Tc production in a nuclear reactor are discussed.

Keywords

^{95m}Tc ; ^{99m}Tc production; molybdenum matrixes; nuclear reactors; neutron capture reactions; secondary reactions

Introduction

Among the long-lived technetium radioisotopes, the most frequently used is, possibly, ^{95m}Tc. Because of its convenient 61 d half-life (National Nuclear Data Center, 2016) and the multiple gamma transitions associated with its decay, ^{95m}Tc is employed as tracer, in order to study the dissemination of the element in the environment and in many animal and vegetal systems.

The production of ^{95m}Tc rests on the use of cyclotrons, by bombardment of molybdenum with protons or deuterons, or alpha particles on niobium. In connection with reactor neutrons, the only mechanism that can lead to ^{95m}Tc is through the