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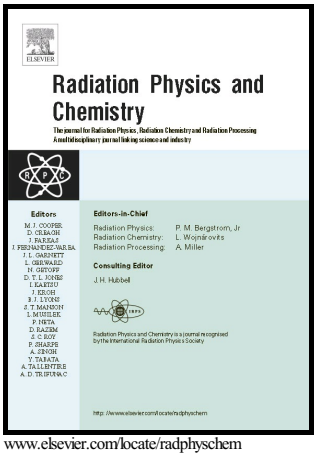

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Air Radon equilibrium factor measurement in a Waste Water Pre-Treatment Plant

J. E. Martinez[a], B. Juste[a], J. Ortiz[b], S. Martorell[b], G. Verdu[a]

[a]Instituto de Seguridad Industrial, Radiofísica y Medioambiental (ISIRYM). Universitat Politècnica de València, Camí de Vera s/n. 46022, Spain
[b]Laboratorio de Radioactividad Ambiental. Universitat Politècnica de València, Camí de Vera s/n. 46022, Spain

Abstract

We analyze in this paper a Waste Water Pre-Treatment Plant (WWTP) located at the Mediterranean coast with air radon concentration above Spanish action level (600 Becquerel per cubic meter).
This paper presents a method for radon equilibrium determination by gamma spectrometry measuring of the radon progeny concentrations in the air, in order to estimate WWTP workers effective dose more exactly.
The method is based on simultaneous sampling of air through a filter paper and alpha spectrometry measurement of radon activity concentration in the air.
According to the measured radon activity concentration in the air of 368±45 Bq/m^3 the equilibrium factor between radon and progenies is estimated to be F = 0.27, which is in good agreement with expected values.

Keywords: Radon, equilibrium factor, gamma spectroscopy, Bateman equation, radon progeny.

1. Introduction

Equilibrium factor between radon and short-lived progenies is of special importance for dose assessment from radon inhalation and it should be determined in each radon monitoring.

Direct measurements of radon decay products concentration are difficult to perform and rather limited. Therefore, they are estimated taking into account the equilibrium between radon and its decay products.

According to UNSCEAR (UNSCEAR., 2000), radon Equilibrium-Equivalent Concentration (EEC) is calculated:

$$\mathrm{EEC}_{\mathrm{Rn-222}} = 0.105\mathrm{C}_{\mathrm{A\ Po-218}} + 0.515\mathrm{C}_{\mathrm{A\ Pb-214}} + 0.38\mathrm{C}_{\mathrm{A\ Bi-214}} \quad (1)$$