Disintegration, ventilation and deposition were considered as removal processes of the radon and its short-lived daughters in air and the respective concentration equations were applied. Calibration coefficient ($K_F$) of the solid state nuclear track detector (SSNTD) LR-115 for radon and the equilibrium factor ($F$) were related to track densities of the bare detector ($D$) and the filtered one ($D_0$). A useful relationship between $K_F$, $F$ and detector sensitivity coefficient ($k$) was derived. Using the calibrated value $k = 3.29 \times 10^{-3}$ m, the exposed detectors gave the average values of the equilibrium factor, calibration coefficient and indoor radon concentration of a single house living room in Osijek 0.46, 142.3 m$^{-1}$ and 37.8 Bq m$^{-3}$, respectively.

INTRODUCTION

Measurement method of the radon ($^{222}$Rn) concentration in air ($C_0$) by means of the solid state nuclear track detector (SSNTD) uses the following relationship:

$$C_0 = \frac{D_0}{k}$$  \hspace{1cm} (1)
where

\[ D_o \] - is the detector track density of the Rn α-particles and
\[ k \] - is the detector sensitivity coefficient which is to be calibrated.

Equation (1) is applied to the filtered detector with a membrane that has high permeability for radon but does not allow daughters to pass since they are mainly in ionic form and become attached to the membrane and to aerosols. In case of the bare nuclear track detector the following equation is to be used:

\[ c_o = K_F D \] (2)

where

\[ K_F \] - is the calibration coefficient depending on the equilibrium factor (F) between radon and its daughters, and
\[ D \] - is the track density of the bare detector.

The equilibrium factor is defined as:

\[ F = \frac{1}{c_o} (f_1 c_1 + f_2 c_2 + f_3 c_3) \] (3)

with the constants \( f_1 = 0.105 \), \( f_2 = 0.516 \) and \( f_3 = 0.380 \) and the \( c_1 \), \( c_2 \) and \( c_3 \) concentrations of the \( ^{218}\text{Po} \), \( ^{214}\text{Pb} \) and \( ^{214}\text{Bi} \) radon daughters, respectively.

**METHODS**

An α-track detector records α-particles from the \( ^{222}\text{Rn} \), \( ^{218}\text{Po} \) and \( ^{214}\text{Po} \), since the bare detector track density (D) is proportional to concentrations of the mentioned radionuclides in air:

\[ D = k (c_o + c_1 + c_4) \] (4)