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Determination of Radon Concentrations in Soil Around Al-Tuwaitha Site Using CR-39 Detector

Abstract: In this work radon concentration in 37 soil samples collected from 17 regions surround the (Al Tuwaitha) were measured by using solid-state nuclear track detector (SSNTD.s) CR-39 with natural exposure of one month, and by comparison with standard samples. The radon concentration in the soil samples was about $(9.583 \pm 0.369 - 28.029 \pm 0.631) \text{ Bq/m}^3$ in locations one (Rotate Salman) and eight (An area agricultural near high-voltage towers) respectively, with rate of $(20.939 \pm 0.541) \text{ Bq/m}^3$. The specific activity of radium (Ra) dissolved during generate radon were ranging between $(3.37 - 9.857) \text{ Bq.kg}^{-1}$, with rate of $(7.393) \text{ Bq.kg}^{-1}$, surface emission of radon gas rate in the soil was found between $(0.144 - 0.422 \text{ Bq/m}^2.\text{h})$ with rate of $(0.314 \text{ Bq/m}^2.\text{h})$ and their mass emission of radon gas rate has the highest value of $(0.016 \text{ Bq / kg . h})$ and lower value $(0.005 \text{ Bq / kg . h})$ with rate of $(0.012 \text{ Bq / kg . h})$. These results are within the acceptable limit that recorded by UNECEAR and ICRP.

Keywords- Radon gas, soil, CR-39 detector, Area Exhalation Rate, Mass Exhalation Rate, Radium concentration.

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