

International Conference on Safety and Security of Radioactive Sources: Accomplishments and Future Endeavours (CN-295)



Contribution ID: 213

Type: Poster

Radiation dose from NORM-added Paint Products

Wednesday, 22 June 2022 16:20 (10 minutes)

Abstract

The present study investigates commercially available ion paint, evaluation being made using gamma-ray spectroscopy and Geant4 Monte Carlo simulations. A particular concern being the daily inhalation exposure dose. Organ doses have been simulated using the MIRD5 mathematical phantom, with incorporation of dose conversion factors. Sample code IP04 was found to contain the greatest activity, at 4.45, 31.9, and 2.96 Bq g⁻¹, for 238U, 232Th, and 40K respectively, while the sample code NP18 recorded the least activity, at 16 and 30, Bq kg⁻¹ for 238U and 232Th, respectively. Accordingly, code IP04 paint offered the greatest concentration, with mean percentages of 0.81, 0.026 and 0.06 for Th, U and Pb, respectively. Its use in a room designated room 1 is shown to give rise to an annual effective dose of 1.53 mSv y⁻¹ given the assumption of exposure for a period of 8 h day⁻¹. In brief, using these ion paints doses can exceed the annual public dose limit of 1 mSv.

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Session Classification: Poster Session 2

Track Classification: 05. Harmonized regulatory approaches (e.g., authorization, inspection and enforcement processes) for the safety and security of radioactive sources