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Novel method to make a calibrated thoron source

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Abstract content (Max 300 words) **Formatting & Special chars**

Researchers around the world have recognized that radon (Rn-222) is a hazard to human health, and more recently thoron (Rn-220) has been found to be a larger problem than expected. Rn-222 is a progeny of radium in the uranium series while Rn-220 is a member of the thorium series. The recent interest for measuring Rn-220 activity in air and the following development of the corresponding measurement techniques, require the improvement of standards for the calibration and characterization of the measurements device which have often been optimized for radon measurements.

In this work we describe a simple, cheap method that can provide a reasonably accurate flow of Rn-220 for checking Rn-220 detectors and to investigate Rn-220 measurements. A novel Rn-220 source has been developed using Thorium Nitrate crystals, that are dissolved in water and the Rn-220 is created by bubbling air through the solution using the continuous monitoring detector system, the RAD7.

The strength of the source is found by simultaneously measuring the gamma rays from the water using a sodium iodide detector (NaI). The difference in the gamma rays that are emitted before and after the Rn-220 in the thorium decay chain give an accurate measurement of the concentration of Rn-220 that leaves the water. The measurement has to be taken over a few hours to allow for the decay of Pb-212 that has a half-life of 10.6 hours.

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

PhD

Main supervisor (name and email) and his / her institution

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