

Producing a standard thoron source.

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Thoron (Rn-220) is the radon isotope with a shorter half-life (55 s) than the better known Rn-222. Thoron has been identified as a possible health concern in specific places such as monazite processing plants and (rare-earth) mines. The short half-life of thoron (55.8 s) makes thoron calibration sources and thoron chambers less common than the corresponding radon ones. We have developed an inexpensive and straight forward but accurate standard thoron source that can be set up easily in typical nuclear environmental laboratories. The source of thoron is a solution of $\text{Th}(\text{NO}_3)_4$ in water. Thoron is extracted by bubbling air through the solution using an aerator. The gamma rays from the solution are measured at the same time. The thoron activity concentration in the exit stream follows from the reduction in the intensity of the gamma rays from the progeny of thoron over time.

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