

# International Conference on the Management of Naturally Occurring Radioactive Materials (NORM) in Industry

## VIRTUAL EVENT

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## Management of Naturally Occurring Radioactive Material (NORM) in Industry

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## ASSESSMENT OF INTERNAL AND EXTERNAL EXPOSURE DOSE IN PRODUCTS USED MONAZITE

The local media reported that some products were emitting excessive amounts of radon, a radioactive chemical element linked to lung cancer. In fact, the products contained monazite powders, is an anhydrous phosphate of the rare earth metals especially thorium[1]. The products were emitting thoron gas (Rn-220) that has a relatively shorter half-life than radon. It does not significantly regulate to natural background radiation exposure of thoron; however, in this case, it was necessary to evaluate of radiation doses for human health. We measured radon and thoron concentration using a radon meter (RAD7, DurrIDGE Company Inc., USA) in succession at a different height above the products surface and evaluated the annual internal doses rates. In addition, we analyzed thorium and uranium elements in products using by quadrupole inductively coupled plasma mass spectrometry (ICP-MS, Agilent Technologies., Japan) to assess external dose rates. In order to evaluate exposure dose rates by radon and thoron, we used the dose conversion convention for radon proposed by the International Commission on Radiological Protection(ICRP). This paper mainly describes that the determination of uranium and thorium concentrations in products using by ICP-MS.

Firstly samples were collected around the point measured by RAD7 and ashed in an oven for a day at 550 °C. The samples were dissolved by fusion with lithium metaborate to break refractory complex. In order to remove the interference in ICP-MS measurement, the dissolved solutions were precipitated at pH 7 using Fe co-precipitation, and all the extracts were digested in HNO<sub>3</sub>. Finally the solution was diluted about 10,000 times using 3% pure HNO<sub>3</sub>. The instrumental conditions were optimized to determination of uranium and thorium. The measured results were carried out with an external exposure assessment using ICRP 103.

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