

Field experience of thoron interference on radon measurements

Shinji Tokonami¹, Quanfu Sun², Tetsuo Ishikawa¹, Atsuyuki Sorimachi¹, Yosuke Kobayashi¹, Tibor Kovács³, Shinji Yoshinaga¹, Suminori Akiba⁴

¹National Institute of Radiological Sciences, Japan

²National Institute of Radiological Protection, China

³University of Pannonia, Hungary

⁴Kagoshima University, Japan

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Abstract- Radon (^{222}Rn) has been recognized to be one of the most important contributors to natural radiation sources over the past 30 years. Subsequently recent studies have revealed that there is a clearly positive relationship between indoor radon concentration and lung cancer risk even at the low exposure level below 200 Bq m^{-3} . Thus the WHO launched the International Radon Project in January, 2005. In this project, radon is regarded as the global burden of disease and the second leading cause of lung cancer incidence followed by tobacco smoking. Many countries are about to solve the problem worldwide. In general, residential radon is regulated by the action level with $200\text{-}600 \text{ Bq m}^{-3}$ of radon concentration based on the ICRP recommendation. On the other hand, the WHO is planning to recommend a new guideline of radon exposure. The action level might be revised with a lower level ($100\text{-}400 \text{ Bq m}^{-3}$) than before.

From such international circumstances, importance of radon issues has been recognized again. If the new guideline is set up, an indoor radon survey will be definitely initiated. Although radon concentrations are to be measured in this survey, measurement data have to be sufficiently assured from the viewpoint of their reliability. For radon measurements, there are many radon measuring devices: alpha track detectors, charcoal canisters, electrets and so on. In particular, alpha track detectors and electrets are suitable for large-scale and long-term surveys so as to obtain annual radon concentrations. Those detectors are also often used in some epidemiological studies. They are generally calibrated in a well-controlled environment such as a radon chamber. However, Tokonami (2005) has pointed out that some of them are sensitive to thoron (^{220}Rn). This finding implies that radon readings will be overestimated and consequently may lead to biased estimates of lung cancer risk. The present study describes thoron interferences on radon measurements from the viewpoint of from field experiences.