



# RAD

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**BOOK OF  
ABSTRACTS**

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## Calibration of recycled open-faced charcoal canisters for two- and one-day radon concentration measurements

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Charcoal canisters have been used for indoor radon concentration measurements for more than 40 years. Although there are several methods that use charcoal canisters, the basic principle is the same. As air passes through the canister, radon is being adsorbed and the quantity of adsorbed radon is proportional to the radon concentration in air. Radon canisters can be modified in different ways, e.g. by adding diffusion barriers, and different techniques can be used for counting. The method used in Vinča Institute of Nuclear Sciences (VINS) uses open-faced canisters, which are measured on gamma spectrometers, according to US EPA method. In this method, it is necessary to wait 3 hours after closing the canisters in order to reach equilibrium, because radon is determined via gamma emissions of radon progeny -  $^{214}\text{Pb}$  and  $^{214}\text{Bi}$ . Canisters are commonly exposed for periods between 48 hours and 144 hours.

Open faced radon canisters are typically used with calibration factors provided by manufacturers, or with EPA calibration factors. Calibration in EPA method is performed with canisters as received from manufacturers, but most laboratories recycle canisters by drying in order to reuse them. Since calibration factor is calculated based on the canister mass change (due to water adsorption) and duration of exposure, different moisture content due to recycling may introduce a bias in the measurement. A correction for this influence might be necessary. In order to investigate this effect, recycled canisters used in VINS have been exposed to different radon concentrations in a radon calibration chamber in Montenegro Bureau of Metrology. Exposures lasted for 48 h and the results have been used to assess the validity of used calibration factors. Additional measurements lasting  $(24\pm 2)$  h have been performed at several selected measurement locations, covering two orders of magnitude of concentrations. Simultaneously, concentrations were measured with an AlphaGUARD detector, which was used as a reference instrument. This experiment allowed determination of calibration factor for short term measurements lasting 1 day. It is, however, necessary to perform additional study of uncertainty before using charcoal canisters for one-day measurements.

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