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Ex-situ Measurement of Radon Emanation for Ultralow-background Experiments

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Radon provides one of the most significant backgrounds in low background experiments since it is an inevitable product of natural uranium and thorium. It is continuously emanated from materials and is noise to rare event particle detectors especially dark matter search experiments because of the alpha decays from the subsequent Po-218, Po-214, and Po-210. A radon emanation detection system, which includes a stainless steel emanation chamber, a low background ZnS(Ag) cell, a radon transfer and collection assembly, and a charcoal trap has been developed and used to study radon emanation from materials in vacuum and in gas. In this talk, the hardware of the system and measurements of radon emanation rates from various materials will be presented.

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