

Study of radon reduction in gases for rare event search experiments

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In noble liquid detectors searching for rare interactions, radon, a decay product of trace amounts of natural uranium present in detector components, leads to the dominant background of the detector. The results of the R&D studies of radon reduction system for noble liquid detectors performed at The University of Michigan will be presented. The adsorption characteristics of radon in nitrogen, argon, and xenon carrier gases on various types of charcoals with different adsorbing properties and intrinsic radioactive purities have been studied in the temperature range of 190-295 K at flow rates of 0.5 and 2 standard liters-per-minute. Performances of different charcoals have been quantified using parameters such as average breakthrough time, dynamic adsorption coefficient, and number of theoretical stages.

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