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Emanation and Diffusion of Radon through Gaskets for SuperCDMS SNOLAB

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The SuperCDMS SNOLAB experiment, currently under construction, will attempt to directly detect dark matter particles. Shielding surrounding the experiment's detectors will reduce interactions of particles from radioactivity and cosmic rays. A gas purge will remove radon from gaps in the shielding to reduce backgrounds further. Gaskets used to seal this purge volume must allow sufficiently low radon diffusion through them while emanating little radon into the purge volume. Radon diffusion, solubility, and permeability were inferred by measuring the time-dependent radon concentration in a volume separated by gaskets made of EPDM, Zip-A-Way, and Silicone. Although the silicone tested has better radon properties, EPDM also is sufficient and is easier to use, and so EPDM will be used for the SuperCDMS radon barrier, with ZIP-A-Way used to reduce diffusion and patch leaks.

Primary authors: DEVRIES, Brandon M.; SCHNEE, Richard (South Dakota Mines); BOWLES, Michael A.

Presenter: SCHNEE, Richard (South Dakota Mines)

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