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Radon Emanation System DEBORAH NOBLE, Syracuse University — 222Rn is a significant contributor to radioactive backgrounds. We are constructing a radon emanation system that includes several chambers which would emit the lowest levels of 222Rn possible and be almost completely airtight, minimizing 222Rn contributions from both inside and outside the chambers. This system includes several electropolished stainless steel chambers, copper gaskets, and weldless metal seals. This system makes it possible to more accurately determine the amount of 222Rn emanated from a sample or the amount present in a particular gas. A sample is placed inside one of these chambers and the system is then purged using a boil-off gas such as Helium. Any residual radon is reduced to negligible levels using a low-radon charcoal trap. After allowing the sample to emanate radon for around a week, the chamber's contents are pumped through a nitrogen cold trap, which collects the radon. The system is heated, allowing radon to expand into another detection chamber, this one containing a Si PIN diode that will collect the 218Po and 214Pb daughters of 222Rn. This system can also be used to determine the amount of radon in a sample of gas, however the gas would be released directly into the detection chamber, and is useful in many applications.

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