

Creating high-precision, low-uncertainty reference gas standards for the groundwater community

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Scientists at Pacific Northwest National Laboratory (PNNL) have developed a capability to produce high-precision, low-uncertainty reference gas standards that can support the groundwater age-dating community [1-3]. Specifically, ^{37}Ar is a challenging reference gas to maintain given the relatively short half-life (35.0 days). PNNL is refining an absolute gas counting capability, a first-principles technique using length-compensated proportional counters, to determine the specific activity of a gas [4-6]. This approach utilizes the ISO Guide to the Expression of Uncertainty in Measurements (GUM) to build an uncertainty budget and ensure a high-precision, low-uncertainty reference gas standard [7, 8]. These standards are planned to be used by the groundwater community for interlaboratory comparisons of key measurements (^{37}Ar and ^{39}Ar). This will allow for identification/reduction of laboratory bias and result in better constrained models with tighter uncertainties for understanding underground production rates (for example).

References:

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