

A New Laboratory for Radiokrypton and Radioargon Dating

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The long-lived noble-gas isotope ⁸¹Kr, ⁸⁵Kr, and ³⁹Ar are ideal tracers for environmental water and ice samples. Together with ¹⁴C, they cover an age range from a few to 1.4 million years. ⁸¹Kr-dating, a concept pursued over the past four decades has become available recently to the earth science community at large due to the development of the Atom Trap Trace Analysis (ATTA) method. In order to meet the increasing demands from the earth science community, we have established a new laboratory dedicated to radiokrypton and radioargon dating. For Kr-dating, we can measure samples as small as 1-2 uL STP of Kr gas. This allows us to perform radiokrypton dating not only on groundwater samples (20–40 kg of water) but also on glacier ice samples (10–20 kg of ice). Moreover, we are developing an ³⁹Ar-dating apparatus sensitive enough to handle 1-2 mL STP of Ar samples. A pre-enrichment procedure would raise the count rate of ³⁹Ar by 1-2 orders of magnitude.

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