

Dating and Tracing Groundwater and Ice with ^{81}Kr and ^{85}Kr

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^{81}Kr (half-life 229kyr) is an ideal tracer for old groundwater and ice in the age range of 10^5 – 10^6 years. To meet the increasing demands from the earth science community, a new and improved Atom Trap Trace Analysis (ATTA) apparatus is developed at the University of Science and Technology of China (USTC). This instrument is capable of analyzing over 300 samples per year. Each measurement requires 1-2 μL STP of krypton gas, which can be extracted from 20-40 kg of water. New sampling and purification systems have also been developed at USTC. With the new portable sampling system, the time for on-site sampling is typically less than one hour. The same sampling and atom-trap apparatuses are also used to analyze ^{85}Kr (half-life 11 yr) to trace young groundwater.