ANIMAL STUDIES OF Al METABOLISM WITH AMS TECHNIQUE

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Animal tests have been performed to study the correlation of Al metabolism and senile dementia. Four groups of lab rats were fed with normal food, normal food with low and high aluminium contents and high aluminium content plus calcium and magnesium respectively for six to 12 months. At the end of this period, a mapping test was made to record the degree of cognitive degeneration. Half of the rats were sacrificed and Al contents in serum and various organs measured by atomic absorption spectroscopy. The other half were injected with ^{26}Al, killed after 5, 10, 15, 25 and 35 days and ^{26}Al contents measured by AMS. The distribution of Al and ^{26}Al was analyzed and the correlation of the accumulation of ^{26}Al with the initial Al content and dementia was studied.

MEASUREMENT OF ^{81}Kr IN THE ATMOSPHERE

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We present the first AMS measurement of the ^{81}Kr concentration in atmospheric krypton. Our result, $^{81}Kr/Kr = (5.3 \pm 1.2) \times 10^{-13}$, agrees well with previously known values from low-level-counting of pre-nuclear krypton. This experiment is part of a program to develop AMS for long-lived noble gas radionuclides (Kutschera *et al.* 1994). Since noble gases do not form stable negative ions, these measurements are performed with positive-ion machines.

The use of ^{81}Kr ($t_{½} = 2.1 \times 10^5$ a) as a valuable tracer was suggested by H. Oeschger (1987) at the Niagara-on-the-Lake AMS conference in 1987. The main interest of ^{81}Kr lies in the possibility it provides for dating deep ice from the polar ice caps, and old groundwater. Due to its favorable goechemical properties it is possibly the only cosmogenic radionuclide that has the potential to become a reliable absolute chronometer for these applications. However, the extremely low concentration of ^{81}Kr in these reservoirs (≈1000 atoms per kg ice or water) demands a very high overall detection efficiency.

We have performed first AMS measurements of ^{81}Kr in atmospheric krypton using the superconducting electron cyclotron resonance source coupled to the K1200 Cyclotron of Michigan State University. The main technical problem for the detection of ^{81}Kr with AMS resides in the separation from the isobaric ^{81}Br background. As there is still very little understanding of the source of bromine we concentrated our efforts on the separation of ^{81}Kr from ^{81}Br using full stripping.

After the acceleration of $^{81}Kr^{17+}$ to 45 MeV/A in the cyclotron, the ion passed through a Be foil (18.8 mg/cm^2). The fully-stripped $^{81}Kr^{36+}$ (≈70%) is then separated from the $^{81}Br^{35+}$ using the A1200 fragment separator. Various experimental configurations as well as support gasses and stripper foils have been tested in an attempt to optimize this method. A summary of the results for natural and neutron-activated ^{81}Kr samples is given below.