DETECTION OF ^{41}CA WITH ^{7}LI^{37}Cl MOLECULAR PILOT BEAM

T. BABA, N. FUNAYA, N. MIYAZAKI, T. TAKAHASHI, T. KAIKURA, R. SEKI, S. SUENO and Y. NAGASHIMA

AMS Group, Tandem Accelerator Center, University of Tsukuba, Japan

The dating of foraminifera (Nagashima, Baba *et al.*, in press), which is one of our current interests, is extensively studied by ^{14}C AMS technique with $^{7}Li_2$ pilot beam (Nagashima *et al.* 1994). As the next item on the dating program, dating of foraminifera with ^{41}Ca has been tried. A long half-life of ^{41}Ca enables us to investigate very old foraminifera (several hundred thousand years old). Expanding the idea of the molecular pilot beam method used in ^{14}C, ^{26}Al, and ^{36}Cl measurements (Nagashima *et al.* 1994), a ^{7}Li^{37}Cl molecular pilot beam has been introduced for stabilizing the terminal potential of ^{12}UD pelletron machine.

^{41}Ca standard was prepared with the ^{40}Ca neutron capture process in a nuclear reactor. ^{41}Ca to ^{40}Ca ratio was controlled to be 1.0510–10. Under the chemical process, the form of $CaCO_3$ changes to CaF_2 in order to diminish oxygen. The CaF_2 sample is mixed with TiH_2, and LiCl and the mixture is pressed into the hole of an ion source sample holder. A CaH_3^- negative beam was created in the ion source as well as the ^{7}Li^{37}Cl molecular pilot beam. The strong ^{41}K background can be greatly decreased because there is no KH_3^- formation in the ion source. ~1mA CaH_3^- current can be extracted and $^{41}CaH_3^-$ and ^{7}Li^{37}Cl$^-$ are transported into the ^{12}UD through a 90-degree inflection magnet. After passing through the tandem, both ^{41}Ca10$^+$ and ^{37}Cl9$^+$ are analyzed by an analyzing magnet. Here, the ^{37}Cl9$^+$ beam can produce enough current on a pair of off-axis slits that are set at the image plane of the magnet and the current is used for terminal potential control. On the other hand, ^{41}Ca10$^+$ is guided into an AMS beam line and it is finally detected by a gas DE-SSD E counter. Overall beam transport efficiency is *ca.* 2.5%. We will report the method of ^{41}Ca detection with the ^{7}Li^{37}Cl molecular pilot beam in detail as well as some preliminary results of ^{41}Ca measurements.

REFERENCES

Nagashima, Y. *et al.* 1994 *Nuclear Instruments and Methods in Physics Research* B92.

Nagashima, Y., Baba, T. *et al.*, in press, Proceedings of 7th International Conference on Heavy Ion Accelerator Technology. Canberra, September 1995.

USE OF CHLORINE-36 AS TRACER FOR THE EVOLUTION OF WATERS IN GEOTHERMAL AND TECTONIC ACTIVE AREAS IN WESTERN TURKEY

W. BALDERER

Geological Institute, Engineering Geology, ETH Hönggerberg, CH-8093 Zürich, Switzerland

and

H.-A. SYNAL

Paul Scherrer Institut, c/o Institute for Particle Physics, ETH Hönggerberg, CH-8093 Zürich, Switzerland

Within the joint, interdisciplinary project "Marmara" of ETH Zürich and the Istanbul Technical University (ITÜ), six areas along the North Anatolian Fault Zone (Schindler *et al.* 1993; Straub and Kahle 1994) are studied. In particular, effects of active tectonics as evidenced by geology, geodesy and seismology on groundwater circulation and on heat flow pattern are investigated. For groundwaters of such tectonic active regions the problem of residence time determination arises, as the usu-