THE DEVELOPMENT OF A GAS ΔE-POSITION SENSITIVE E DETECTOR FOR AMS STUDIES

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An AMS system at the University of Tsukuba has been realized by a molecular pilot beam method. A di- or tri-molecular beam is generated together with particles of interest for the terminal potential control (Nagashima et al. 1993, 1994). This method essentially requires changing the charge state of the particles by passing through a thin foil in order to separate the pilot particles from the particles of interest. After passing through the foil, the particles diverge by multiple-scattering in the foil and consequently the size of a particle spot on a detector becomes large. In the case of $^{36}$Cl measurement, the diameter of a Cl spot is observed to be ca. 15 mm. Adding to this enlargement, the spot moves around the center by the influence of long-term instability of electronic instruments. Maximum fluctuation width observed is 8 mm. So, our AMS studies, at least, require a ΔE-E detector with an entrance window of 23 mm in diameter. On the other hand, the large acceptance of the detector may cause unforeseen background increment. The background increment might be suppressed by using position information if these background particles are focused to a different position on the plane of the entrance window.

Here, a detector that consists of a gas ΔE and a two-dimensional position-sensitive E counter has been developed. Diameter of the entrance window is 30 mm. A Capton window foil, $7.5 \mu m$ thick, is strong enough to keep $\sim 40$ Torr ionization gas pressure without any foil supporter. The $48 \times 48 \text{ mm}^2$ active area of the two-dimensional position sensitive E counter is big enough to cover the size of the entrance window and the particle divergence in the ionization gases. The detector is operated with iso-butane gasses. Pressure is precisely controlled by a gas flow system.

We will report the result of performance test, with $\alpha$ sources as well as some preliminary results of radio-isotope detection.

REFERENCES


AUTOMATED SYSTEMS AND TECHNIQUES UTILIZED AT THE NOSAMS SAMPLE PREPARATION LABORATORY: AN UPDATE OF PRODUCTIVITY AND QUALITY ISSUES

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The primary charge of the National Ocean Sciences AMS (NOSAMS) Facility at the Woods Hole Oceanographic Institution is to supply high-throughput, high-precision AMS $^{14}$C analyses for sea waters collected as part of the World Ocean Circulation Experiment (WOCE). To accomplish this we have automated as many sample preparation systems as possible. At AMS-6, preliminary laboratory automation was described (Cohen 1993), as well as external and internal checks on quality control issues pertaining to sample preparation (Osborne 1993). In July of 1995, automation of the graphitization system in the Sample Preparation Lab (SPL) was completed. Major improvements included a second CO$_2$ splitting line (aliquots for $^{13}$C, $^{14}$C, and archiving), a linear track system