

AMS

ion source

²⁶MgO

26A10

V.=10.2MV

²⁶Mg⁷⁺ Slit

²⁶Mg⁷⁴

mag.

mag.

45° mag

·(n'~13)

26 🗛 113+

deflector (8

Switching

Outline of ²⁶Al-AMS

mag.

•Full stripping technique:

•Pilot beam: ²⁶MgO⁻

•Beam current of AlO

²⁶Al^{13+/27}AlO⁻ [counts/µC]

from Al_2O_3 sample : ~1.5µA

Summary of ²⁶Al-AMS

²⁶Al and ³⁶Cl AMS system at the University of Tsukuba: A progress report

AMS-IS

12UD Pelletron

³⁶Cl⁻

12Cl3-

/_=10 MV

FC :

ST

tandem accelerator

Electrostatic steer Electrostatic quar (triplet) Faraday cup

atic steerer

37CI-F

36Cl-¹²Cl₃⁻ 11514

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Automatic sample changer

(25 samples on the rotating whee

AMS-beam line

AMS ion source

New Terminal

HL.

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р. Д.

Introduction

The present status of the Tsukuba AMS system on the 12UD Pelletron tandem accelerator is reported. At present, long lived radioisotopes of ²⁶Al, ³⁶Cl and ¹²⁹I are able to be measured by the Tsukuba AMS system. After the AMS-9 conference, several efforts have been paid on the ²⁶Al and ³⁶Cl-AMS system in order to improve the performance. Several improvements have been applied on the AMS beam line, so that ³⁶Cl-AMS is able to be performed with 10 MV terminal voltage instead of 9 MV. Therefore, the energy of the ³⁶Cl⁹⁺ beam increases from 90 MeV to 100 MeV. This energy increment helps us to get more clear separation between ³⁶Cl and ³⁶S.

Accelerator facility



²⁶Al-AMS

²⁶Al¹³⁺

Ε-ΔΕ

²⁶A1

16 counts

- Million

 $^{26}Mg^{11+}_{26}Mg^{12+}$ 1054 counts

5 minutes measurement

Standard sample

Standard sample

²⁶Al-AMS has also progressed in AMS technique. The ions extracted from the ion source were changed

to ²⁶AlO⁻ ions from ²⁶Al⁻ because several advantages would be expected. ²⁶MgO⁻ molecular ion is used as

the pilot beam. After passing through the accelerator at 10.2 MV, ²⁶Al⁷⁺ and ²⁶Mg⁷⁺ with the energy of 77.7 MeV are selected by the analyzing magnet. ²⁶Al⁷⁺ ions are changed to full stripped ²⁶Al¹³⁺ ions by a

second charge exchange foil and then they are separated by the following energy and mon

lectors. The effective detection limit is reached to better than 5.8×10^{-15} for 26 Al/27Al ratio.

²⁶Al/²⁷Al=4.99×10⁻¹³

10 minutes measurement

26A1/27A1=7.44×10-11

26A1

99 counts

²⁶A1

No count

Standard sample

Blank sample

80 minutes measurement

²⁶A1/²⁷A1=4.69×10⁻¹²

10 minutes measurement

ΔE



 $35_{C1} + 1$ Upper limit of the ²⁶Al-AMS sensitivity: 5.8×10⁻¹⁵

E [MeV]

Summary of ³⁶Cl-AMS

As a result of these improvements, the detection efficiency of ${}^{36}Cl$ increased to 1.5 times and the discrimination between ${}^{36}Cl$ and ${}^{36}S$ was much improved. Over all accuracy is $\pm 3\%$ and the effective letection limit is reached to 2×10^{-14} for ${}^{36}Cl/{}^{35}Cl$ ratio.

carbon foil. [by Shima et al.,]

Equilibrium charge fraction of ³⁵Cl ion after passage through a



Tandem Accelerator Complex





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