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## A home-made compact multi-isotope AMS system at CIAE

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Developing the compact AMS system for multi-isotope measurement is the tendency for AMS system development. After developing single stage 0.2MV-AMS system dedicated for  $^{14}\text{C}$  measurement and air-insulated 300KV-AMS system used for heavy nuclei measurement, A compact multi-isotope AMS system which can be used for  $^{14}\text{C}$ ,  $^{26}\text{Al}$ ,  $^{236}\text{U}$ ,  $^{239}\text{Pu}$  etc. measurement has been developed at CIAE. Utilizing the compact design of the AMS system, The floor space of the compact AMS system is about 25m<sup>2</sup> which is half of the air-insulated 300KV AMS system.

The structure of the AMS system is shown in Figure 1. The ion source is 40-sample negative sputter ion source. The injection system consists of a 90° double focus spherical electrostatic analyzer (ESA) and a double focus 90° injection magnet with a deflection radius of 650 mm for both the ESA and the injection magnet. The accelerator is a compact accelerator with a total length of 1.1 m and a terminal voltage of 260 kV. An electrostatic quadrupole was installed after the accelerator for beam focusing. After that, a double focus 90° analyzing magnet and a 90° double focus ESA and with a deflection radius of 650 mm for both the ESA and the analyzing magnet. In order to improve the mass resolution, another 70° analyzing magnet with deflection radius of 700 mm is equipped behind the ESA, finally, a gas detector with 30 nm silicon nitride membranes as entrance windows is used.

The performances of the AMS system have been tested with  $^{129}\text{I}$  and  $^{239}\text{Pu}$ . The transmission efficiency of  $^{127}\text{I}$  for charge state of 2+ is more than 50% at accelerator's terminal voltage of 0.2 MV, and the sensitivity of  $^{129}\text{I}/^{127}\text{I}=1.5\times 10^{-14}$  has been obtained; The detection limitation of better than 0.1fg for  $^{239}\text{Pu}$  at accelerator's terminal voltage of 0.23 MV has been achieved. The performances of  $^{14}\text{C}$ ,  $^{26}\text{Al}$ ,  $^{236}\text{U}$  etc. are under developing.

Fig.1 The schematic diagram of the AMS system

### Student Submission

No

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