

2 - 37 A Reliable Water Target for Production of [^{18}F] Fluoride

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There has been a significant growth in the number of small cyclotrons and other accelerators dedicated to the production of short lived radioisotopes. One of the most common isotopes produced is ^{18}F in the form of [^{18}F] fluoride, used primarily for the synthesis of 2- [^{18}F] fluoro-2-deoxy-D-glucose(FDG) for the positron emission tomography(PET). The fluoride is produced by the $^{18}\text{O}(\text{p}, \text{n})^{18}\text{F}$ reaction on enriched [^{18}O] water, which peaks in cross section at 5 MeV. In this paper, we design and construct a reliable water target to produce [^{18}F] fluoride.

1 Design and construction of the water target.

We design a double-window cooling system to transfer the heat energy that produced by the nuclear reaction. The vacuum window is a 25 μm havar foil, and the target window is a 30 μm Ti foil.

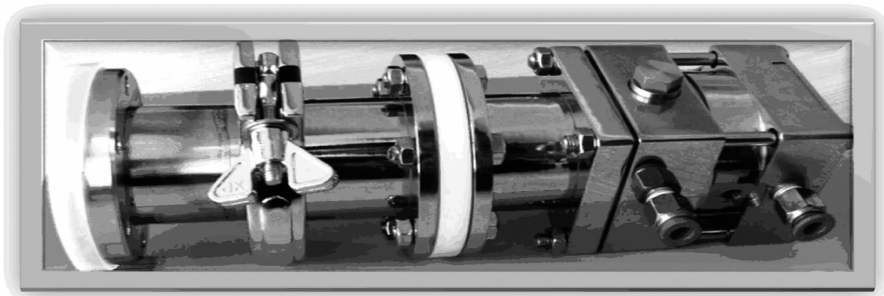


Fig. 1 The water target.

2 Off-line test of the water target.

We take some vacuum and pressure endurance tests of this target. From the experiment, we can see that the vacuum degree can reach 10^{-5} Pa, and it can endure a pressure of up to 5 MPa. These properties can meet the on-line production parameters.

In conclusion, we design and construct a reliable water target, and we assume that this target can be used to produce [^{18}F] fluoride.

Reference

[1] A. D. Roberts, L. C. Daniel, R. J. Nickles, Nucl. Instr. and Meth. , B99(1995)797.