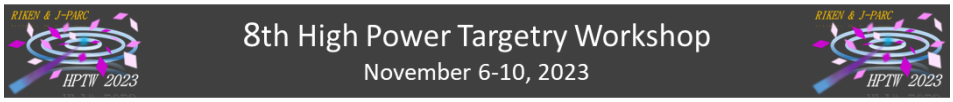

Contribution ID: **74** Type: **Poster**

Graphite enclosure power density experiment

Tuesday, 7 November 2023 17:44 (1 minute)

The demand for target radioisotopes in the field of target radioisotope medicine is increasing. Next-generation treatment alpha isotopes such as 211At, 225Ac, and 226Ra are at the forefront of this area. During our investigation, we identified the regulations surrounding radioprotection and pollution as a critical issue in the mass production of these isotopes using accelerators.

To address this challenge, we have developed a graphite enclosure structure for the target material. This structure is designed to withstand higher temperatures without fear of melting or the release of gaseous radioactive substances. And the structure can be easily squashed or oxidized in the dry processing stage.

Initial testing of this structure has been conducted using a 30MeV 4He2+ beam with an intensity of 30 euA and a beam sigma of 2 mm. These parameters were chosen to simulate the power density of the project's goal. The setup was installed in a vacuum chamber with a water cooling plate in contact with the graphite enclosure. The test was conducted for 30 hours, with the graphite enclosure maintained at approximately 210℃. The temperature was measured using a thermocouple probe inserted into a hole in the structure, and the results were quickly responded to by the beam trips.

After the radiation, the induced surface exhibited slight color changes, but no visible effects were observed on the other side. This initial testing demonstrates the feasibility of the graphite enclosure structure for the production of next-generation treatment alpha isotopes.

Themes for the contribution

4 Target design, analysis, and validation of concepts:

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