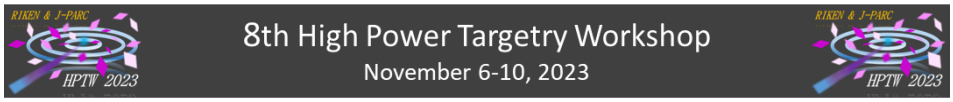

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Isotope batch production target design

Tuesday, 7 November 2023 17:46 (1 minute)

We are pleased to announce the launch of a cutting-edge medical isotope production technology research project in Lanzhou, China. This initiative is designed to address the regional demand for advanced medical radioactive isotopes of the higher quality.
To achieve this goal, the project utilizes a thin metal thorium target, which maximizes specific radioactivity while minimizing total activity, thus simplifying the complex byproduct processing and regulations. The metal thorium is precision cut into 25mm diameter, 1mm thick slices and sealed in a graphite enclosure. These units are placed at a 30 degree angle to the beam direction. The target is cooled through contact cooling in a vacuum chamber, with the graphite enclosure serving as a crucible to prevent the escape of radioactive byproducts and allow for higher temperatures. This design ensures a higher temperature tolerance and enables a significant portion of beam power to be removed through radiation heat transfer, while also leading to increased contact heat transfer to neutralize the disadvantage of a vacuum environment. A dry vacuum chamber is advantageous for beam window design, and an automatic robot handling system is in place to facilitate the transport and retrieval of targets for subsequent processes. The radiation period is set to 10 days, resulting in a final activity of kCi per target unit at the end of the bombardment. With the use of beam point mapping technology, 4×5 targets are radiated as a batch. Although the total activity reaches 20kCi EOB, the radiochemical group does not need to process them at once. Thus, only the target station requires heavy concrete shielding, while the chemical processing can proceed with thinner lead shielding hotcells. The facility will be equipped with state-of-the-art robots and AGVs to facilitate the transport of shielded cells. The building construction is in the process of closing up, and the project is expected to be commissioned within 4 years.

Themes for the contribution

4 Target design, analysis, and validation of concepts:

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