Innovative approach for sustainable and low-waste production of ^{99}Mo-based radiodiagnostics using accelerator-based neutron source

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Nuclear medicine diagnostics that are integral to modern healthcare, heavily rely on the radionuclide ^{99}Mo, traditionally produced in nuclear reactors through the fission of ^{235}U [1, 2, 3]. However, the complex radiochemical processing involved generates substantial radioactive waste, necessitating a shift towards more sustainable practices. This poster presents the *^{99}Mo Best* joint project, an initiative focused on developing an innovative, cost-efficient concept for the production and utilization of ^{99}Mo-based radiodiagnostics, utilizing the ^{98}Mo(n, γ)^{99}Mo reaction eliminating fissile materials and minimizing radioactive waste.
The project comprises three key sub-projects:

1. **Process Optimization:** This involves refining the processes for generating ^{99}Mo-based radiodiagnostics, as well as improving their processing and utilization in clinical settings.
2. **Neutron Target Technology:** Developing high neutron flux density neutron target technology is crucial for irradiation with reduced radiation doses, ensuring safe handling and processing of Mo samples post-irradiation.
3. **Radiation Protection and Disposal:** Addressing safety concerns, this sub-project aims to determine radiation protection and disposal issues pertinent to the novel ^{99}Mo production process, ensuring a secure and sustainable approach.

This comprehensive approach aims to create a paradigm shift in the field of nuclear medicine by offering a sustainable and efficient alternative to traditional ^{99}Mo production methods, mitigating environmental impact and advancing the application of accelerator-based neutron radiation sources in medical radioisotope production.

References

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