Production and Separation of Radioactive Isotopes at SFU's Neutron Generator Facility

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Presentation Description:

The presentation will address research on the production and separation of radioactive isotopes at SFU's neutron generator facility, with a focus on neutron reactions, the separation method used to remove product isotopes from their parent sample, and the effectiveness of the separation methodology via observation of radioactive decay.

Abstract:

One of the fastest growing branches of medicine currently is nuclear medicine. Radioactive isotope production is needed for various medical imaging applications such as PET and SPECT scans and non-invasive cancer retreatment such as targeted alpha therapy. The neutron generator facility at SFU's Nuclear Science Laboratory (NSL) is used to produce radioactive isotopes that are researched for possible applications, and fundamental science. My research focuses on the production and separation of radioactive isotopes from neutron-induced nuclear reactions. These reactions occur at low rates which means that the product isotopes will be present in very small quantities mixed in with their parent sample. The number of radioactive isotopes produced in an experiment at the NSL can be 16 orders of magnitude smaller than the number of atoms in the original sample. The problem to solve is how to separate radioactive product isotopes from parent isotopes effectively and quickly. This is being done by taking advantage of the fact that nuclear reactions have high energy and can break chemical bonds. This allows for the opportunity to separate nuclear products chemically. By studying the radioactive decay of the separated isotope, I can verify the theoretical concepts of neutron-based nuclear reactions and the effectiveness of the separation method used. My presentation will cover how the production and separation of radioactive isotopes works and a summary of how I am using this method to produce and separate radioactive Sodium-24 from Aluminum oxide and water.

References/Acknowledgments:

I would like to also acknowledge the other members of my research group Matthew Martin, Frank Wu, and Andrew Redey as well as my supervisor Krzysztof Starosta for all of the help and knowledge that they have shared with me.