

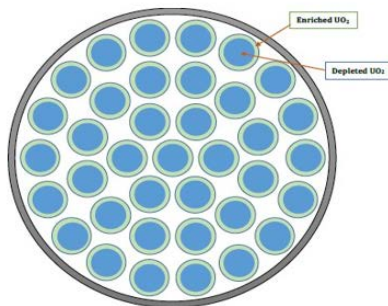
CANDU-Core Compatible Bundle for Production of Molybdenum-99

Background

The increasingly unstable supply of ^{99m}Tc , a medical isotope used in imaging procedures, has caused the price of its parent isotope, ^{99}Mo , to triple in the U.S. between 2009-2010. Market demand for ^{99}Mo exceeds one billion dollars per year worldwide and the market is growing at a rate of 5% annually. Deterioration of the two primary production facilities has made them unreliable and devastated the once-stable supply, forcing delay or cancellation of the 55,000 medical imaging procedures (encompassing over thirty different diagnoses) performed each day in the U.S. alone.

Technology Overview

The research led by Dr. Eleodor Nichita and Jawad Haroon has led to an innovative method of producing ^{99}Mo using CANDU reactors. The technology is simple and robust in nature, relying on the standard CANDU fuel bundle geometry to ensure its ease of adoption in any existing CANDU reactor without the need for changes to the core. The ^{99}Mo -producing bundle is dimensionally identical to the standard CANDU fuel bundle. This identity allows the new bundle to have the same hydraulic resistance and heat-transfer properties as the standard bundle, and to also be compatible with fuel-channel components and fuel-handling devices.



Schematic of the Proposed ^{99}Mo -Producing Fuel Bundle Design

The novel design of the ^{99}Mo -producing fuel bundle differs from the standard design by using two concentric fuel regions in each fuel element: the outer one consisting of low-enriched uranium dioxide (≤ 19.5 wt.% ^{235}U) and the inner one consisting of depleted uranium dioxide (< 0.711 wt.% ^{235}U). The thickness of the enriched layer is chosen such that the neutronic properties of the ^{99}Mo -producing fuel bundle are virtually identical to those of the standard CANDU fuel bundle, allowing the new bundle to be used in existing CANDU cores without the need to modify safety or control devices.

Business Opportunity

Ontario Tech University looks to work with companies and develop relationships tailored to their individual objectives and interests. We are happy to explore different models, such as collaboration, license, options, assignment, etc. We are confident that through enabling the company to utilize their proven business model the Ontario Tech University technology will be able to make a strong impact in the marketplace.

Inventors:

Eleodor Nichita and Jawad Haroon

Publication:

[Development of a 37-element Fuel Bundle for the Production of Molybdenum-99 in CANDU Power Reactors](#)

About Ontario Tech University

Ontario Tech University conducts high-quality, rigorous research designed to meet the research and development needs of business and industry and benefit society. Whether the focus is on developing hydrogen-from-nuclear or fuel-cell technologies, improving network security, or understanding youth crime, we are committed to interdisciplinary research and development that addresses social, environmental, health, and economic challenges.