

Valerie Rahing

Major: Chemical Engineering
University: University of Missouri-Columbia
Faculty Mentor: Dr. Gary Ehrhardt
Mentor Department: MU Research Reactor
Funded by: MU Research Reactor

Development of a portable source for production of Re-188

Valerie Rahing, Gary Ehrhardt and Alan Ketring

Rhenium 188 is a radioisotope that is potentially useful for treatment of certain types of cancer including bone cancer and circulating tumors. Its short half-life of 16.7h however makes it an awkward choice for clinical use as much of the product will decay during shipping. This project focuses on the development of a portable source of producing high specific activity Rhenium188 from a longer lived ($t_{1/2} = 69.4d$), low specific activity source; Tungsten 188. Tungsten 188 is obtained by double neutron capture from $Na_2^{186}WO_4$. Peroxide complexes of the Sodium Tungstate ($Na_2^{186}WO_4$) and Zirconyl Nitrate ($ZrO(NO_3)_2$) are formed and then mixed with heating to yield a $ZrO^{186}WO_4 \cdot xH_2O$ gel precipitate. This is loaded into a column and washed with saline. As the W-188 decays to Re-188, high specific activity Sodium Perrehnate ($Na^{188}ReO_4$) will be eluted from the column. This can then be reduced to form the final drug on location. Future studies may include a similar method of production for a Mo-99/Tc-99m generator, another drug commonly used for imaging. The final poster will also discuss crystalline content of the $ZrO^{186}WO_4 \cdot xH_2O$ gel, which must be minimized to maximize the yield of Re-188.