Chemical Processing for a Non-uranium Production of $^{99}\text{Mo}/^{99m}\text{Tc}$

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ABSTRACT

A non-uranium pathway for production of hundreds of curies of $^{99}\text{Mo}/^{99m}\text{Tc}$ isotope requires enriched $^{98}\text{Mo}$ or $^{100}\text{Mo}$ material. An estimated cost for >95% enriched $^{98/100}\text{Mo}$ is about $1,000/g. In order to meet supply demands, kilogram quantities are required. Due to the high cost for the enriched target material, it is important that potential manufacturers have a means to efficiently recycle the enriched Mo into new targets as part of the complete production scheme. Impurities present in the enriched material, and those introduced during the post-irradiation processing, or recycling, need to be closely monitored. Experimental results on irradiation of Mo targets, dissolution studies to optimize the target properties, and a solvent extraction approach to recycle enriched Mo material will be presented.