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Development of a Gas Stopper for Fusion-Evaporation Products
JORDAN SEFCIK, Angelo State University, CHARLES FOLDEN III, MARISA ALFONSO, Texas A&M University — New plans are needed in order to chemically study superheavy elements. According to a design from Michigan State University, implementing a gas stopper is the best way to do this. After being transferred through a Momentum Achromat Recoil Separator (MARS), produced ions of ^{158}Hf eventually reach a variable angle mylar degrader, Reaction Transfer Chamber (RTC) window, which is followed by a gas stopper of helium. Inside the gas cell is a series of electrodes, followed by a funneled "flower petal" design. Using the simulating program SIMION, the electrodes have electric potentials applied to each of them in order to funnel the ions into a small opening at the end of the gas stopper. Here the ions will undergo certain chemistry experiments in order to learn more about them. The hafnium ions enter the gas stopper with an energy of $\sim$3 MeV. However, when they reach the end of the cell, they must have an energy on the order of 0.1 eV in order perform certain chemistry experiments on them. Using an optimized set of potentials, the survival rate for the simulated ions was 96%. These results are agreeable in the sense that within error bars, there is no room for improvement in extraction efficiency. This set-up also gives desirable results for ^{257}Rf, which is considered a superheavy element and is thought to have the same periodicity as hafnium.

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