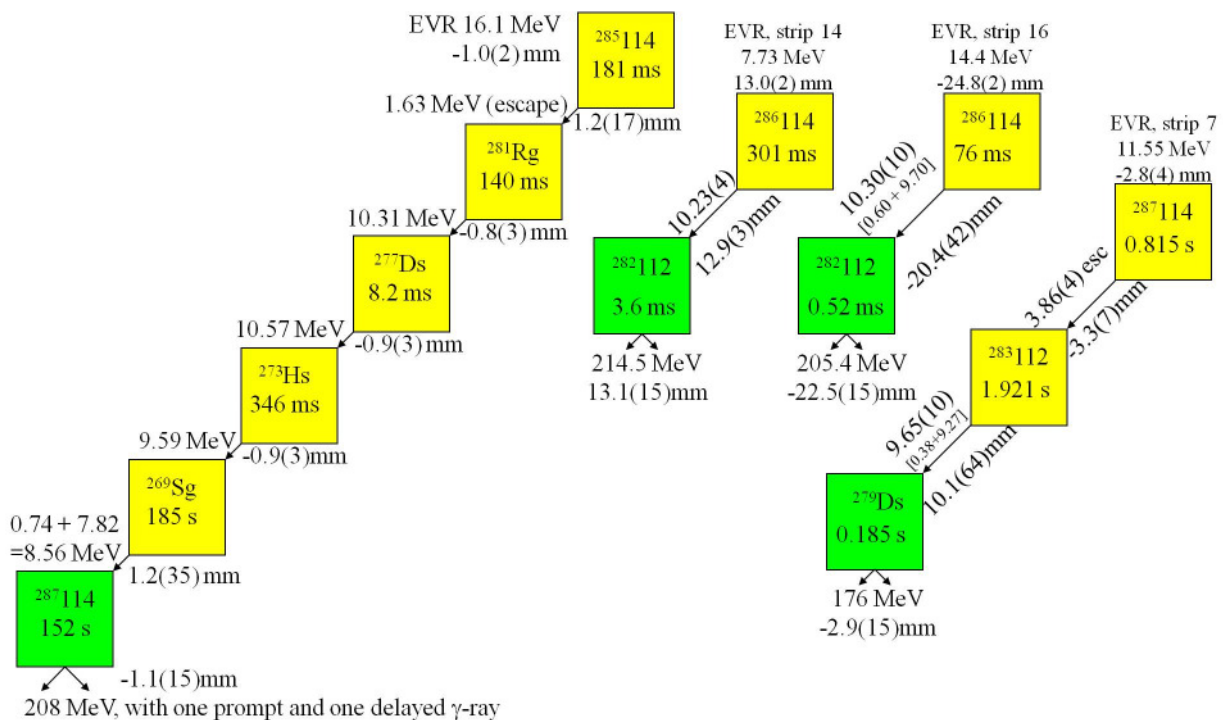


Superheavy Element Research at the Berkeley Gas-Filled Separator

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The study of transactinide elements ($Z \geq 104$) is a topic of great interest in current nuclear chemistry research. Recently, relatively long-lived nuclides with $Z \geq 112$ have been produced and confirmed in $^{48}\text{Ca} + \text{Actinide}$ reactions, opening up a new avenue for superheavy element research. Studies have been undertaken at the Lawrence Berkeley National Laboratory using the Berkeley Gas-filled Separator (BGS) to test heavy element formation models. Lately, these studies have been extended to ^{48}Ca beams with actinide targets and nuclear structure studies. These experiments have led to the first confirmation of element 114 in the $^{242}\text{Pu}(^{48}\text{Ca}, 3-4n)$ reaction and the production of $Z=100-106$ isotopes around the $N \sim 152$ shell for nuclear structure studies. More recently, the western slope of the island formed by nuclides produced via $^{48}\text{Ca} + \text{An}$ reactions has been extended with the discovery of 6 new isotopes using the $^{242}\text{Pu}(^{48}\text{Ca}, 5n)^{285}114$ reaction. Current developments nuclear structure and superheavy element studies, as well as future plans and improvements at the BGS will be discussed.



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