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(I) The Power of Mass-Number Identifications for Heavy Element Experiments

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Isotopes of Heavy and Super Heavy nuclei are typically produced in fusion-evaporation reactions. In these types of reactions neighboring isotopes are often produced simultaneously. This makes it incredibly difficult to assign experimentally observed decay properties to specific isotopes. Presently, such assignments are heavily reliant on the use of excitation functions, cross-bombardment reactions, and the assumption that charged-particle emission does not occur. However, without direct-experimental confirmation that a specific isotope or mixture of isotopes had been produced for a given reaction, it is possible that misassignments have been made. At Lawrence Berkeley National Laboratory, the recent addition of FIONA (For the Identification of Nuclide A) to the Berkeley Gas-filled separator now allows for a produced isotope or mixture of isotopes to be directly identified by their mass numbers. Recent measurements were performed on the lightest mendelevium isotopes (A =244-247) to confirm that previously-reported decay properties had been correctly assigned to the appropriate isotope. These studies included the unambiguous identification of the new isotope 244Md. These and other recent results will be discussed. These results highlight the necessity of utilizing mass-number identifications for isotopes produced in fusion-evaporation reactions.

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