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Heavy Element Research at Texas A&M University

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At the Cyclotron Institute at Texas A&M University, the Heavy Elements Group has been working to study compound nucleus survivability, develop new techniques for heavy element chemistry experiments, and increase the sensitivity of the AGGIE gas-filled separator. As an analog of superheavy element production, we have investigated the effects excitation energy, deformation, and neutron binding energy using the ^{44}Ca + ^{154,156,157,160}Gd reactions. Current research is focused on the ^{48}Ti + Gd, Dy reactions. In addition, we have been modifying Si detectors by adding a covering layer of Au and various organic monolayers; these effectively convert the detectors into a chromatography column. We recently completed a study of the adsorption of Er, Ir, and At on two different self-assembled monolayer (SAM) surfaces, and we are planning a future experiment to study the adsorption of Po on a SAM created with 1,9-nonanedithiol. An offline source of ^{216}Po is being used for preparatory experiments and an online experiment using short-lived Po isotopes is planned. We are also collaborating with researchers from the Paul Scherrer Institute in Switzerland to perform chemical experiments on nuclides with sub-second half-lives. We are upgrading the maximum magnetic rigidity of AGGIE to enable future experiments with heavier elements, including a potential study of No adsorbed on a SAM. Operational improvements at the Cyclotron Institute, including the use of a metal ion volatile organic compound (MIVOC) as ion source material, have also increased our sensitivity. This talk will discuss the most recent results and future plans.

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