Abstract Submitted
for the APR13 Meeting of
The American Physical Society

Projectile influence on production cross section for ^{48}Ca-, ^{50}Ti-, and ^{54}Cr- induced fusion-evaporation reactions D.A. MAYOROV, T.A. WERKE, M.C. ALFONSO, M.E. BENNETT, C.M. FOLDEN III, Cyclotron Institute, Texas A&M University, College Station, TX 77843, USA — Evaporation residue excitation functions for ^{48}Ca, ^{50}Ti + ^{159}Tb and ^{48}Ca, ^{54}Cr + ^{162}Dy were measured at Texas A&M University using the vacuum spectrometer MARS. The produced residues are weakly deformed nuclei near the $N = 126$ shell closure. However, the production cross sections are insensitive to the associated shell stabilization to the fission barrier, an observation previously reported in literature. The ratio of maximum production cross sections between the ^{48}Ca/^{50}Ti and ^{48}Ca/^{54}Cr reactions is ≈ 47 and >7100, respectively. These substantial differences can be reproduced in theoretical calculations by inclusion of collective enhancements during de-excitation of the compound nucleus. The competition between quasifission and complete fusion further contributes to the observed separation in the excitation functions. Model-dependent estimates of the compound nucleus formation probability, P_{CN}, yield ratios of $P_{CN}(^{48}\mathrm{Ca} + {}^{159}\mathrm{Tb}) / P_{CN}(^{50}\mathrm{Ti} + {}^{159}\mathrm{Tb}) \approx 2.5$ and $P_{CN}(^{48}\mathrm{Ca} + {}^{162}\mathrm{Dy}) / P_{CN}(^{54}\mathrm{Cr} + {}^{162}\mathrm{Dy}) \approx 5$. Heavy-ion fusion reactions with ^{48}Ca, ^{50}Ti, and ^{54}Cr projectiles are of interest due to modern-day efforts to synthesize superheavy elements 119 and 120 in warm fusion reactions with projectiles having Z >20.

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Date submitted: 14 Jan 2013 Electronic form version 1.4