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Synthesis and study of the decay properties of isotopes of superheavy element Lv in Reactions 238U + 54Cr and 242Pu + 50Ti

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To understand the possibilities of synthesizing new elements 119 and 120, it is of particular importance to determine the most optimal reactions. This issue depends both on the reaction cross-section value and the availability of the necessary target isotopes and accelerated ions. To do this, it is important to measure the cross sections of reactions that lead to lighter elements, but whose cross sections are obviously higher, for example, ^{242}Pu(^{50}Ti,xn)$^{292-x}$Lv and ^{238}U(^{54}Cr,xn)$^{292-x}$Lv. The cross sections of these reactions can be compared with, e.g., the cross section of the ^{245}Cm(^{48}Ca,2-3n)^{290,291}Lv reaction, which could determine the degree of decrease in the production cross section for element 116 during the transition from ^{48}Ca to ^{54}Cr. This will help to obtain more reliable information about the process of the compound-nucleus formation (the second stage of the fusion-evaporation process). Note, so far no cross section of the reaction of complete fusion of actinide nuclei with ions heavier than ^{48}Ca has been measured.
From a comparison of the production cross sections for isotopes of element 116 in reactions with ^{48}Ca and ^{54}Cr, it follows that the transition to a heavier particle led to a drop in the cross section by more than factor of 100.

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