

$^{237}\text{Np}+^{48}\text{Ca}$ reaction and decay properties of ^{282}Nh and descendant nuclei at DGFRS-2

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In this study, $^{237}\text{Np}+^{48}\text{Ca}$ reaction performed at the DGFRS-2 gas filled separator [1] at the Super Heavy Element Factory [2] at Flerov Laboratory of Nuclear Reactions will be presented. The significance of this reaction is that it can be used to measure the decay properties of the daughter products of the $^{243}\text{Am} + ^{54}\text{Cr}$ reaction, which can be used for the synthesis of the element 119. During the experiment, three alpha decay chains of ^{282}Nh are observed. These chains consist of the descendant nuclei ^{278}Rg , ^{274}Mt , ^{270}Bh , and terminate with the spontaneous fission of ^{266}Db . While the half-lives of ^{282}Nh , ^{278}Rg , and ^{270}Bh are found to be consistent with the experimental systematics for odd- Z nuclei. The half-life of the third isotope in the chain, ^{274}Mt , exceeds the systematic expectation by two orders of magnitude [3]. This significant deviation in half-life might indicate the presence of a long-lived isomeric state in ^{274}Mt . This increased half-life has been measured for the first time for the heaviest odd- Z nuclei with $Z \geq 107$. Reaction cross section is $0,43^{+0.46}_{-0.25}\text{pb}$ for the 3n channel. This value is consistent with the shape of the excitation functions of the 3n channel in ^{48}Ca -induced reactions [4]. The upper cross-section limit of the 4n reaction channel was 0,28 pb.

References

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