PROTON TRANSFER IN REACTIONS ^{3}He + ^{197}Au, ^{194}Pt

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The experimental data on the formation cross sections for isotopes ^{197}Hg in reaction ^{3}He + ^{197}Au and ^{194}Au in reaction ^{3}He + ^{194}Pt [1] are analyzed based on the solution of the time-dependent Schrödinger equation [2] in combination with calculations within the statistical model using the computational code of the NRV knowledge base [3].

The comparison of the experimental data on the formation cross section for the ^{194}Au isotope in the ^{3}He + ^{194}Pt reaction with the results of calculations is shown in Fig. 1. It can be seen that this isotope is mainly formed via the transfer process. Two mechanisms of transfer are proposed. The first mechanism consists in the transfer of proton to the high excited states of the target followed by its drop to the lower levels and the subsequent neutron evaporation due to the energy gain. The second mechanism is the transfer of proton from the projectile to the target combined with the transfer of the neutron from the target to the projectile leading to the formation of the ^{3}H nucleus.

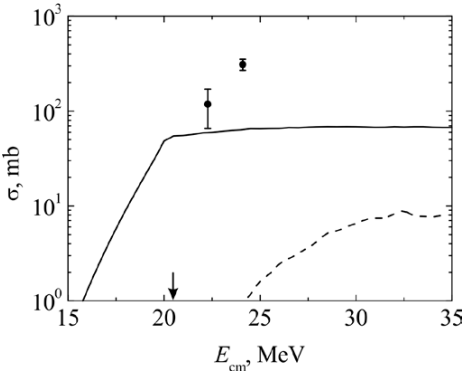

Fig. 1. Cross section for the formation of the ^{194}Au isotope in the ^{3}He + ^{194}Pt reaction: dots are experimental data from [1], the solid curve is an estimation of the contribution of evaporation of a neutron after proton transfer. The dashed curve is the contribution of the fusion-evaporation process calculated using the statistical model code of the NRV web knowledge base [3]. The arrow indicates the position of the Coulomb barrier.

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