THE HINDRANCE TO COMPLETE FUSION OF NUCLEI RELATED WITH THE NUCLEON TRANSFER MECHANISM

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The difference between observed cross sections of the evaporation residues (ER) of the $^{34}S + ^{208}Pb$ and $^{36}S + ^{206}Pb$ reactions formed in the $2n$ and $3n$ channels has been explained by two reasons related with the entrance channel characteristics of these reactions. The first reason is that the capture cross section of the latter reaction is larger than the one of the $^{34}S + ^{208}Pb$ reaction since the nucleus-nucleus potential is more attractive in the $^{36}S + ^{206}Pb$ reaction due to two more neutrons in isotope ^{36}S. The second reason is the difference in the heights of the intrinsic fusion barrier B^*_{fus} appearing on the fusion trajectory by nucleon transfer between nuclei of the DNS formed after the capture. The value of B^*_{fus} calculated for the $^{34}S+^{208}Pb$ reaction is higher than the one obtained for the $^{36}S + ^{206}Pb$ reaction. This fact has been caused by the difference between the *N/Z*-ratios in the light fragments of the DNS formed during the capture in these reactions. The *N/Z*-ratio has been found by solution of the transport master equations for the proton and neutron distributions between fragments of the DNS formed at capture with the different initial neutron numbers $N = 18$ and $N = 20$ for the reactions with the ^{34}S and ^{36}S, respectively. The nature of the hindrance to complete fusion in the case of the $^{34}S + ^{208}Pb$ reaction has been done in Ref. [2], where the authors have used new fission measurements and existing evaporation residue and fission excitation function data for reactions forming Cf isotopes to investigate the dependence of the quasifission probability and characteristics of fission products on the properties of the entrance channels. But authors of [1, 2] could not explain the reason of hindrance to complete fusion in $^{34}S+^{208}Pb$ and they restricted by assuming fusion probability $P_{CN} = 0.1$ to reproduce the measured *xn* ER cross sections for the $^{34}S + ^{208}Pb$ reaction by the statistical model calculations. We will demonstrate (see Ref. [3]) that the difference in the reaction mechanism is related in the yield of the projectile-like quasifission products in these reactions.

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3. A.K.Nasirov *et al.* // Eur. Phys. Jour. A. 2019. V.55. P.29.