

Mass and angular distributions of the reaction products in heavy ion collisions

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The study of the mechanism of the fusion-fission process in the reactions with massive nuclei is of interest for both experimentalists and theorists to obtain a favorable way for the synthesis of superheavy elements or exotic nuclei far from the stability line. When the yield of evaporation residues is not main contribution in reaction products, an unambiguity in estimation of the complete fusion cross section appears due to overlaps of the mass and angular distributions of the products formed in the fusion-fission, deep-inelastic collision and quasifission products. This fact attracts attention of researcher. The hindrance to complete fusion is mainly caused by the quasifission process. The yield of the evaporation residues proves surely that the complete fusion has taken place while their contribution to the fusion cross section is dominant. A comparison of the experimental cross sections of the evaporation residues in reactions leading to formation of the less fissible compound nucleus is a good way to estimate the contribution of the quasifission in the reaction mechanism in reactions with heavy ions at low energies. The comparison of the results obtained by the Indian experimentalists [1] is a reliable demonstration of the strong role of the quasifission as a hindrance to complete fusion. We have studied the mass and angular distribution in reactions $^{48}\text{Ca}+^{144}\text{Sm}$ and $^{48}\text{Ca}+^{154}\text{Sm}$ [2,3] already and there are a lot of citations to this paper from the theoretical and experimental groups. The results of the Australian group [4,5] have obtained interesting results about angular and mass distributions of fissionlike products. The relation between characteristics of the measured angular and mass distributions and the entrance channel properties will be discussed.

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