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Formation of Superheavy Nuclei in Massive Fusion Reactions

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**摘要** Within the concept of the dinuclear system(DNS), by incorporating the coupling of the relative motion to the nucleon transfer process, a dynamical model is proposed for describing the formation of superheavy residue nucleus in massive fusion reactions, in which the capture of two heavy colliding nuclei, the formation of compound nucleus and the de-excitation process are calculated using empirical coupled channel model, solving master equation numerically and statistical theory, respectively. By using the DNS model, the evaporation residue excitation functions in the <sup>48</sup>Ca induced fusion reactions and in the cold fusion reactions are investigated systematically and compared with available experimental data. Optimal evaporation channels and combinations as well as the corresponding excitation energies are proposed. The possible factors that influencing the isotopic dependence of the production cross sections are analyzed. The formation of the superheavy nuclei based on the isotopes U with different projectiles are also investigated.

**关键词** [DNS model](#) [massive fusion reaction](#) [evaporation](#) [residue excitation function](#)

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