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## **Modeling of processes of the formation and transformations of nanoclusters in a rapidly-cooling mixture of a vapor and an inert gas**

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Many modern technologies for the production of nanoclusters are based on a rapid nonequilibrium expansion of the atomic vapor (coal arcs, laser ablation). In our work we study a model for the kinetics of the formation of clusters in a rapidly-expanding mixture of a vapor and an inert gas. The model describes the processes of the three-particle atomic recombination and the nucleation of particles in binary collisions for a given arbitrary time-dependence of the density of the mixture. We perform numerical investigations of the influence of the main parameters of the model and of the shape of the time-dependence of the expansion on the formation of the clusters. The particular attention is paid to the kinetics of the formation and transformations of the carbon clusters (including fullerenes) in a rapidly-expanding mixture of helium and the carbon vapor.