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The condensation phenomena of conserve-mass aggregation model with mass-dependent fragmentation DONG-JIN LEE, SUNGCHUL KWON, YUP KIM, Department of Physics and Research Institute for Basic Sciences, Kyung Hee University — We study a conserved mass aggregation model with mass-dependent fragmentation in regular lattice and scale-free networks. In the model, the whole mass m of a site isotropically diffuse with unit rate. With rate ω, a mass m^λ is fragmented from the site and moves to a randomly selected nearest neighbor site. Since the fragmented mass is smaller than the whole mass m of a site for $\lambda < 1$, the on-site attractive interaction exists for the case. For $\lambda = 0$, the model is known to undergo the condensation phase transitions as the density of total masses (ρ) increases beyond a critical density ρ_c. For $0 < \lambda < 1$, we numerically confirm for several values of ω that ρ_c diverges with the system size L. Hence in thermodynamic limit, the condensed phase disappears and no transitions take place in one dimension. We also explain that there are no transitions in any dimension. On scale-free networks with degree distribution $P(k) \sim k^{-\gamma}$, we numerically confirm for $\gamma > 3$ that the condensation transitions occurs at $\rho_c > 0$ and its nature is the same as that in regular lattice. However, for $\gamma \leq 3$, the condensation always takes place for $\lambda < \lambda_c$ and masses distribute uniformly without aggregation for $\lambda \geq lambda_c$. We derive $\lambda_c = 1/\gamma - 1$ via mean-field argument.

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