

A complete analytical solution to the integro-differential model describing the nucleation and evolution of ellipsoidal particles

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Abstract

In this paper, a complete analytical solution to the integro-differential model describing the nucleation and growth of ellipsoidal crystals in a supersaturated solution is obtained. The asymptotic solution of the model equations is constructed using the saddle-point method to evaluate the Laplace-type integral. Numerical simulations carried out for physical parameters of real solutions show that the first four terms of the asymptotic series give a convergent solution. The developed theory was compared with the experimental data on desupersaturation kinetics in proteins. It is shown that the theory and experiments are in good agreement.

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