# GENERALIZATION OF THE KOLMOGOROV–JOHNSON–MEHL–AVRAMI THEORY TO THE CASE OF NON-UNIFORM NUCLEATION

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S u m m a r y

An expression for the phase volume fraction in a system with a position-dependent nucleation rate is derived in the framework of a geometric-probabilistic approach. As examples of such systems, the following cases are considered: a) a planar layer with nucleation on the mid-plane, an infinitely long cylinder with nucleation on the axis, and a sphere with nucleation at the center; b) nucleation on random planes, on straight lines, and at points in the infinite space. In these cases, the volume fractions are derived for both the time-dependent nucleation rate and the time-dependent growth velocity. The equivalence of the processes of homogeneous nucleation and nucleation at points is established. The obtained results can be used for the analysis of phase transformations starting on grain boundaries (which are modeled by random planes), on grain edges or other linear objects, and at impurity particles.