

KINETIC MODEL OF COMPACTION IN GRANULAR MATERIALS

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S u m m a r y

A simple kinetic equation describing the process of compaction relaxation to the asymptotic quasistationary state and satisfying the Carnahan–Starling equation of state has been formulated for the hard sphere model. In the framework of the Landau approach, we obtain the corresponding analytical solutions, which describe the homogeneous relaxation of the relevant order parameter in a sequential piecewise continuous series of intervals for the packing parameter. The characteristic relaxation time of the order parameter is found as a function of the model parameters. It is shown that the compaction can be satisfactorily described using the model of fractional kinetics, which reproduces the well-known asymptotic dependences in the corresponding limits. The results obtained agree well with the data of measurements concerning the compaction in granular materials under the action of external perturbations.