Physical Review E, vol.91, no.2, pp.022402-1-022402-16, February, 2015.

Mesoscopic nucleation theory for confined systems: a one-parameter model

M.A. Durán Olivencia; J.F. Lutsko

Abstract-

Classical nucleation theory has been recently reformulated based on fluctuating hydrodynamics [J. F. Lutsko and M. A. Durán-Olivencia, Classical nucleation theory from a dynamical approach to nucleation, J. Chem. Phys. 138, 244908 (2013).]. The present work extends this effort to the case of nucleation in confined systems such as small pores and vesicles. The finite available mass imposes a maximal supercritical cluster size and prohibits nucleation altogether if the system is too small. We quantity the effect of system size on the nucleation rate. We also discuss the effect of relaxing the capillary-model assumption of zero interfacial width resulting in significant changes in the nucleation barrier and nucleation rate.

Index Terms-

Citation:
Durán-Olivencia, M.A.; Lutsko, J.F. "Mesoscopic nucleation theory for confined systems: a one-parameter model", Physical Review E, vol.91, no.2, pp.022402-1-022402-16, February, 2015.