

Abstract Submitted
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Characteristic cluster size at coalescence following pressure-induced solidification.¹ FRED STREITZ, JIM GLOSLI, DAVID RICHARDS, Lawrence Livermore National Lab — During the initial period of solidification, clusters of solid phase nucleate and grow rapidly as liquid is converted to solid. This rapid growth period continues until the clusters coalesce into a connected network and little liquid phase remains. Characterizing the nature of this network of clusters at coalescence is important to understanding the character of the solid at much later times. Using large scale MD simulations of liquid Ta under pressure the solidification process is explored in detail from nucleation to coalescence. We extract growth and nucleation rates from our simulations, as well as cluster size distributions that can be compared against the predictions of simple models. We will show that the length scale for the distribution of cluster size at coalescence is set by the interplay of nucleation rate j and growth rate u . In particular, we find that the characteristic cluster size at coalescence $l \sim (u/p)^{1/4}$.

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