

Abstract Submitted
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Generalized Statistical Thermodynamics Applied to Small Material Systems ROBERT CAMMARATA, Johns Hopkins University — When characterizing the behavior of small material systems, surface effects can strongly influence the thermodynamic behavior and need to be taken into account in a complete thermal physics analysis. Although there have been a variety of approaches proposed to incorporate surface effects, they are often restricted to certain types of systems (e.g., those involving incompressible phases) and often invoke thermodynamics parameters that are often not well-defined for the surface. It is proposed that a generalized statistical mechanics based on the concept of thermodynamic availability (exergy) can be formulated from which the surface properties and their influence on system behavior can be naturally and rigorously obtained. This availability-based statistical thermodynamics will be presented and its use illustrated in a treatment of nucleation during crystallization.

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