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**Surface Layer Availability Approach to Systems with Solid-Fluid Surfaces** ROBERT CAMMARATA, Johns Hopkins University — Although the dividing surface method as devised by Gibbs can be used to completely describe the surfaces of fluid systems, in the case of fluid-solid interfaces with a finite size crystal the approach is generally restricted to systems where the solid is a single phase material. This is a result of the fact that the surface chemical potential of the solid component is not well-defined. As a result, Gibbs chose a dividing surface location where the surface excess amount of that component is zero so that the corresponding surface chemical potential was never needed. However this approach cannot be extended to systems containing multicomponent solids. It is proposed that for such systems a surface availability function, analogous to the thermodynamic availability function used in engineering thermodynamics, can be employed. It will be shown that such an approach can be used without the need of a particular dividing surface location, and that more generally the dividing surface construction can be dispensed with in favor of a finite volume surface layer. It is shown that by using this surface layer formulation a variety of problems, including surface adsorption and nucleation during solidification, can be rigorously treated for multicomponent systems.

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