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A Model for Heterogeneous Materials Undergoing Phase Transitions JEEYEON PLOHR, BRADFORD CLEMENTS, FRANCIS ADDESSIO, Los Alamos National Laboratory — We develop a macroscopic model for a heterogeneous material undergoing a phase transition. Such a continuum-level material model, which is needed in practical engineering calculations, must faithfully reflect the micromechanical response of the constituent materials. Using the method of cells, which is a homogenization technique, we derive the constitutive properties of a composite material, part of which undergoes a phase transition. Specifically, we study tungsten heavy alloy (WHA), in which tungsten grains are dispersed within a low-melting-temperature alloy matrix. This material has desirable static properties as a penetrator, but melting in the matrix occurs during loading. Simulations with our model predicts the properties of WHA with different compositions, which can then be optimized.

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