

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Advances in Thermodynamic Mixed Materials Modeling for Resistive MHD JOHN LUGINSLAND, MICHAEL FRESE, SHERRY FRESE, NumerEx — There is continued interest in the modeling of mixed materials for a variety of high current plasma applications ranging from advanced current interrupters via high voltage fuses to high energy density applications, such as high-dose x-ray production via intense electron emission and inertial fusion energy via z-pinch technology. The challenge with mixed materials is the constituent components may be very small physically, requiring high spatial resolution to capture the individual materials. NumerEx has developed a means to build mixed material models from the constituent equations of state, allowing drastically reduced resolution while still retaining the sufficient fidelity for the thermodynamic behavior. We show the protocol for starting with “microscopic” simulations where the individual materials are resolved, and using these calculations to build a “macroscopic” EOS and resistivity tables of a mixed, homogenized material. We demonstrate a new V&V technique for comparing thermodynamic properties between experimental results and mixed materials simulations.

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Date submitted: 23 Jul 2007

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