Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

Modelling Of Shock Waves with Multiple Phase Transitions in Condensed Materials MARC MISSIONNIER, OLIVIER HEUZE, CEA/DIF, B.P. 12, 91680 BRUYERES-LE CHATEL CEDEX, FRANCE — When a shock wave crosses a solid material and submit it to solid/solid or solid liquid phase transition, related phenomena occur: shock splitting , and the corresponding released shocked wave after reflection. Modelling of these phenomena raises physical and numerical issues. After shock loading, such materials can reach different kinds of states:

- single phase states,
- binary phase states, in the case of solid/solid or solid/liquid mixtures
- triple points, where binary zones intersect, for instance solid A/solid B, solid A/liquid, and solid B/liquid.

The thermodynamic path can be studied and easily understood in the (V,E) or (V,S) planes. In the case of 3-phases-tin (β , γ , and liquid) submitted to shock waves, seven states can occur: β , γ, liquid , $\beta - \gamma$, β-liquid, γ-liquid, and $\beta - \gamma$-liquid. After studying the thermodynamic properties with a complete 3 phase Equation of State, we show the existence of these seven states in a hydrodynamic modelling.

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Date submitted: 24 May 2005 Electronic form version 1.4