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Modeling dynamic beta-gamma polymorphic transition in Tin CAMILLE CHAUVIN, CEA Gramat, FRANK MONTHEILLET, Ecole des Mines de Saint Etienne, JACQUES PETIT, CEA Gramat, CEA GRAMAT COLLABORATION, EMSE COLLABORATION — Solid-solid phase transitions in metals have been studied by shock waves techniques for many decades. Recent experiments have investigated the transition during isentropic compression experiments and shock-wave compression and have highlighted the strong influence of the loading rate on the transition. Complementary data obtained with velocity and temperature measurements around the polymorphic transition beta-gamma of Tin on gas gun experiments have displayed the importance of the kinetics of the transition. But, even though this phenomenon is known, modeling the kinetic remains complex and based on empirical formulations. A multiphase EOS is available in our 1D Lagrangian code Unidim. We propose to present the influence of various kinetic laws (either empirical or involving nucleation and growth mechanisms) and their parameters (Gibbs free energy, temperature, pressure) on the transformation rate. We compare experimental and calculated velocities and temperature profiles and we underline the effects of the empirical parameters of these models.

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