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A New Semi-Analytical On-Hugoniot EOS of Materials with Known Shock Velocity Parameters SEIJI SUGITA, KOSUKE KUROSAWA, Univ. of Tokyo, TOSHIHIKO KADONO — Accurate equation of state (EOS) is essential for understanding a variety of geologic processes associated with shock compression of materials. A number of highly sophisticated EOS's have been proposed (e.g., MANEOS and SESAME), covering a wide range of P-T conditions. However, they are complex and require many model parameters. Also, there are many occasions when only terminal thermodynamic variables after adiabatic decompression are needed. For example, when the terminal molecular composition of an impact-induced vapor is necessary, only the initial entropy gain and chemical reaction processes under low-P-T conditions need to be calculated. Then, only an on-Hugoniot EOS and a low-P-T EOS are necessary. To meet such demand, we derive a new semi-analytical on-Hugoniot EOS, which requires only the Hugoniot shock velocity parameters and specific heat. Comparison with experimental data indicates that this EOS can reproduce on-Hugoniot entropy and temperature of ice and quartz very well, despite of its small number of model parameters. Our new EOS will be useful for studying chemical reactions in shock-induced vapor plumes.

Seiji Sugita
Univ. of Tokyo

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