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Time-resolved spectroscopic observations of shock-induced silicate ionization K. KUROSAWA, Univ. of Tokyo, T. KADONO, Osaka University, S. SUGITA, Univ. of Tokyo, K. SHIGEMORI, Y. HIRONAKA, N. OZAKI, T. SAKAIYA, Osaka University, A. SHIROSHITA, Fukui University, Y. CHO, Univ. of Tokyo, S. FUJIOKA, Osaka University, S. TACHIBANA, Univ. of Tokyo, T. VINCI, Ecole Polytechnique, S. OHNO, Chitech, R. KODAMA, Osaka University, T. MATSUI, Chitech — We present the results of shock vaporization experiments with natural silicates at Osaka University. Our goal is to understand the roles of hypervelocity impacts on the origin of the Moon, atmospheres and life. The EOS is the key to investigate such problems because the EOS controls energy partitioning. Thus, we conducted time-resolved spectroscopic observations of shock-heated diopsides to investigate the energy partitioning process. We observed the change in emission spectrum from shock-heated diopside from a blackbody radiation to a number of atomic/ionic emission lines, suggesting that we directly observed the shock-induced vaporization/ionization of natural silicates. The obtained peak shock temperatures are significantly lower than a theoretical prediction. Our results indicate that the electrons may play the important role on energy partitioning as an energy reservoir via ionization (endothermic) and electron recombination (exothermic). The EOS including such electron behavior is expected to be required for the understanding of impact-related phenomena.

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