Estimation of the SO2/SO3 ratio in the vapor cloud produced by the K/T boundary impact event

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The geologic record indicates that the mass extinction at K/T boundary, 65 Myrs ago, was caused by a hypervelocity impact of an asteroid or a comet. At the K/T boundary, a large amount of sulfur was degassed from the impact site. The degassed sulfur converts to sulfuric acid aerosol and stays in the stratosphere for a long time. This reduces the sunlight significantly and leads to a mass extinction. The residence time of sulfuric acid aerosol in the stratosphere depends strongly on the ratio of SO2/SO3. In this study, we calculated SO2/SO3 chemical equilibrium in a vapor cloud and set an extent of conditions that is to be made experiments to estimate the ratio of SO2/SO3. We also report the result of mass spectroscopic analysis of vapor plumes created by i laser irradiation on anhydrite.

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