

The Distribution of Volatiles in Primitive Solar System Bodies

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Understanding the distribution of volatiles in primitive solar system materials is critical in order to understand the source of materials which were accreted by the terrestrial planets. The volatile content of these bodies would have been determined by the physical and chemical processing that their components experienced within the solar nebula. We are currently investigating the dynamical evolution of rocky grains and ices using particle-tracking methods which allow us to follow the pressures, temperatures, and radiation intensities that particles would see within the solar nebula. Using these calculated paths as inputs, we then use chemical kinetic models to understand how primitive solids, ices, and gases interacted in the solar nebula. In particular, we are focusing on understanding how the organic content, noble gas inventory, and isotopic abundances of key volatiles varied with location and time in the early solar system. We will discuss the latest findings of our work and link model predictions to the observed properties of meteorites and comets.