

## Physical properties of water and alcohol?water mixtures in the transition region between ionic fluid and plasma

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Mixtures of water, methane, and ammonia at high pressures and temperatures are thought to be the major constituents of Ice Giants like Uranus and Neptune. Understanding of composition and formation of these planets relies on the existing equation-of-state (EOS) of the elements and compounds. However, these EOS and properties near phase boundaries (e.g. ionic fluid to plasma), where its physical and chemical properties are changing dramatically, have not known well. In order to understand planetary chemistry, laboratory measurements of the material properties are required in the transition regime.

We performed laser-shock compression experiments for liquid specimens to pressures of more than 100 GPa. We measured shock velocities, optical reflectivity, and shock temperature by using Velocity Interferometer System for Any Reflector (VISAR) and Streaked Optical Pyrometer (SOP). These experimental observables are compared between pure water and ethyl alcohol/water mixtures in the transition pressure-temperature regime. Optical reflectivity of the mixture is significantly higher than of water. We here discuss the effect of carbon ions on the mixture reflectivity.

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