

Laboratory Analysis for Planetary Science Research: Application for Cassini-Huygens

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Abstract

The Cassini-Huygens mission has been instrumental in extending our understanding of the Saturnian system, and in particular, the environment of Saturn's largest moon Titan. In this investigation Titan's composition, dynamics, and morphology have been examined and placed in the context of the origin and evolution of the solar system. However, the uniqueness of Titan's environment that Cassini-Huygens has helped reveal requires particular attention in laboratory experiments. In particular, low temperature ultraviolet absorption cross sections and chemical kinetics data with an eye towards examining mechanisms for forming chemical complexes such as amino acids and macromolecular matter that is incorporated into Titan haze are needed. The current state of knowledge provided by Cassini-Huygens will be reviewed. Aspects of laboratory analysis that will facilitate the further interpretation of Cassini-Huygens data will also be addressed along with implications for planetary science research.

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