CONTROL ID: 2568582

TITLE: Neutral Chemistry in Titan's Ionospheric Simulated Conditions

ABSTRACT BODY:

Abstract (2,250 Maximum Characters): Titan’s atmospheric gas phase chemistry leading to the formation of organic aerosols can be simulated in laboratory experiments. Typically, plasma reactors can be used to achieve Titan-like conditions. Such a discharge induces dissociation and ionization processes to the N2-CH4 mixture by electron impact. This faithfully reproduces the electron energy range of magnetospheric electrons entering Titan’s atmosphere and can also approximate the solar UV input at Titan’s ionosphere. In this context, it is deemed necessary to apply and exploit such a technique in order to better understand the chemical reactivity occurring in Titan-like conditions.

In the present work, we use the PAMPRE cold dusty plasma experiment with an N2-CH4 gaseous mixture under controlled pressure and gas influx, hence, emphasizing on the gas phase which we know is key to the formation of aerosols on Titan. Besides, an internal cryogenic trap has been developed to accumulate the gas products during their formation and facilitate their detection. These products are identified and quantified by in situ mass spectroscopy and Fourier-Transform Infrared Spectroscopy. We present here results from this experiment in two experimental conditions: 90-10% and 99-1% N2-CH4 mixing ratios respectively. We use a quantitative approach on nitriles and polycyclic aromatic hydrocarbons.

Key organic compounds reacting with each other are thus detected and quantified in order to better follow the chemistry occuring in the gas phase of Titan-like conditions. Indeed, these species acting as precursors to the solid phase are assumed to be relevant in the formation of Titan's organic aerosols. These organic aerosols are what make up Titan's hazy atmosphere.

CURRENT CATEGORY: Titan: Atmosphere

CURRENT : None

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