

Synthesis of oxygen-free Titan tholins: implications in organic molecules product from hydrolysis

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Abstract

Titan, the largest moon of Saturn, is known for its dense and nitrogen-rich atmosphere. The organic aerosols which are produced in Titan's atmosphere are objects of astrobiological interest. In this paper we focus on their potential chemical evolution when they reach the surface and interact with putative ammonia-water cryomagma[1].

In this context we have followed the evolution of alkaline pH hydrolysis (25wt% ammonia-water) of Titan tholins (produced by an experimental setup using a plasma DC discharge named PLASMA) at low temperature. Our group identified urea as the main product of tholins hydrolysis along with several amino acids (alanine, glycine and aspartic acid). However, those molecules have also been detected in non-hydrolyzed tholins meaning that oxygen gets in the PLASMA reactor during the tholins synthesis [2]. So the synthesis system has been improved by isolating the whole device in a specially designed glove box which protect the PLASMA experiment from the terrestrial atmosphere.

After confirming the non-presence of oxygen in tholins produced with this new experimental setup, we performed alkaline pH hydrolysis of oxygen-free tholins in order to verify that organic molecules cited above are indeed *in-situ* produced.

Those results will be exposed on the poster.

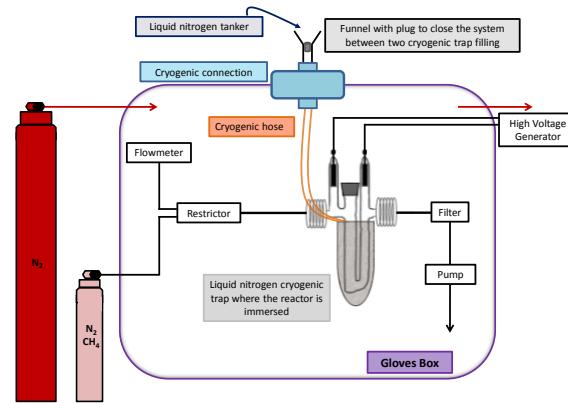


Figure 1: PLASMA experimental setup protected by gloves box

References

- [1] Mitri et al. : Resurfacing of Titan by ammonia-water cryomagma, Icarus, Vol. 196, pp. 216-224, 2008.
- [2] Poch et al. : Production yields of organics of astrobiological interest from H₂O-NH₃ hydrolysis of Titan's tholins, Planetary and Space Science, Vol. 61, pp. 114-123, 2011.