



Far and mid infrared spectroscopy of Titan's tholins

Thomas Gautier (1), Nathalie Carrasco (1), Ahmed Mahjoub (1), Sandrine Vinatier (2), Jean-Jacques Correia (1), Paul Dumas (3), Alexandre Giuliani (3,4), Cyril Szopa (1), and Guy Cernogora (1)

(1) LATMOS, Univ. Pierre et Marie Curie, Univ. Versailles Saint-Quentin & CNRS, Guyancourt, France (cyril.szopa@latmos.ipsl.fr), (2) LESIA, Observatoire de Paris, Meudon, France, (3) Synchrotron SOLEIL, Saint Aubin, France, (4) INRA, Nantes, France

In this work [1] we present mid- and far-Infrared absorption spectra of Titan's aerosol analogues produced in the PAMPRE experimental setup.

We provide a complete dataset regarding the influence that the concentration of methane vapor in the gas mixture has on the tholins spectra. Among other effects, the intensity of the 2900 cm^{-1} pattern (also detected in Titan's atmosphere) increases with the methane concentration. On the opposite, tholins produced with low methane concentrations seem to be more amine based polymers.

Moreover, we compare tholins spectrum with observation of Titan's atmosphere. It is shown that the position of the bands around 2900 cm^{-1} depends on the chemical environment of the methyl functional group. We conclude that the presence of these absorption bands in Titan's atmosphere, as measured with the VIMS instrument onboard Cassini [2] is in agreement with an aerosol contribution.

In the far-infrared, tholins spectrum presents many similarities with the spectra of Titan's aerosols derived from recent Cassini-CIRS observations [3] and allows identification of bands in the spectrum of Titan's atmosphere

REFERENCES

1. T. Gautier, N. Carrasco, A. Mahjoub, S. Vinatier, C. Szopa, J.-J. Correia, P. Dumas, A. Giuliani and G. Cernogora. *Icarus* 221: 320-327(2012).
2. P. Rannou, T. Cours, S. Le Mouelic, S. Rodriguez, C. Sotin, P. Drossart, R. Brown, *Icarus* 208: 850-867 (2010).
3. C. M. Anderson and R. E. Samuelson, *Icarus* 212: 762-778 (2011)