

# **Production of Titan's aerosols analogues by radio frequency plasma discharge**

**C. Szopa** (1), G. Cernogora (1), L. Boufendi (2), M. Cavarroc (2), E. Quirico (3), J.M. Bernard (3), P. Coll (4), A. Jolly (4)

6606 (Fr), LPG, UMR CNRS 6606 (Fr.), (4) LISA, UMR CNRS 7583 (Fr) (Contact: [cyril.szopa@aerov.jussieu.fr](mailto:cyril.szopa@aerov.jussieu.fr))

Titan's organic aerosols play a significant role in the physico-chemical mechanisms of the Titan's atmosphere and heat transfer to the Titan's surface. They also contribute to the physico-chemical properties of the Titan's surface, and more particularly to its reflectance, as they can have accumulated at the surface for a long period. However, the amount of direct data dealing with the Titan's aerosols is quite low, and the data recovered by the Cassini and Huygens probes remain difficult to interpret without any reference data. This is the reason why we developed a laboratory experiment which simulates the Titan's atmosphere chemistry and produces analogues of Titan's aerosols, with the aim to study the properties of the Titan's aerosols and their way of formation. In this experiment, the Titan's chemistry is simulated by a low pressure Radio Frequency plasma discharge in a N<sub>2</sub>-CH<sub>4</sub> gas mixture. In this device, aerosols are produced in the gas phase without interaction with the reactor walls. The aim of this paper is to present recent results obtained with this experiment. Chemical composition, physical properties, morphology of the produced particles will be presented, as well as their dependence on the plasma conditions. Moreover, the properties of the plasma characterized by optical and electrical diagnostics will also be presented. A correlation of the solids particles properties and the plasma characteristics will be attempted. We will finally attempt to correlate these laboratory results with the known properties of the Titan's aerosols in order to try to bring additional information on the Titan's aerosols properties and their way of formation.