FATE OF ORGANIC MOLECULES IN THE MARS REGOLITH UNDER UV RADIATION DEDUCED FROM THE MOMIE LABORATORY EXPERIMENT. C. Szopa[1,6], P. Coll[2], F. Stalport[2], O. Poch[3], M. Jaber[4], J.F. Lambert[5], L. Rouquette[2], and J. Lasne[2], [1] LATMOS, UMR CNRS 8970, UPMC Univ. Paris 06, Universite Versailles St-Quentin, Institut Pierre Simon Laplace, Quartier des Garennes, 11 Boulevard d'Alembert, 78230 Guyancourt, France (cyril.szopa@latmos.ipsl.fr), [2] LISA, Universites Paris Est Creteil and Paris Diderot, CNRS, Institut Pierre Simon Laplace, UMR 7583, 61 Avenue du General de Gaulle, 94010 Creteil cedex, France, [3]Center for Space and Habitability, University of Bern, Sidlerstrasse 5, CH-3012 Bern, Switzerland, [4]LAMS, UMR 8220, 4 Place Jussieu, 75005 Paris Cedex 5, France, [5]LRS, UMR CNRS 7197, UPMC Univ. Paris 06, 3 Rue Galilee, 94200 Ivry, France, [6]Institut Universitaire de France, Paris, France.

Introduction: Among bioindicators or biosignatures, organic molecules present on Mars could be retrieved in the regolith near the surface due to erosion of rocks and gardening of the soil from meteorites bombardment through the Mars history. Once their, the organic molecules are submitted to the harsh surface environmental conditions, including UV radiation. In order to evaluate the influence of these radiation on organics, the MOMIE experiment [1] is devoted to expose pure molecules, or mixture of molecules with minerals, to a UV spectrum simulating the one reaching the Mars surface. From these experiments, it can be deduced their lifetime and/or their possible transformation into other molecules

Experiment: The MOMIE setup enables both to simulate the *in situ* Mars-like UV irradiation and to proceed to FTIR (Fourier Transform Infrared Spectroscopy) monitoring of the sample, at a temperature (218±2 K) and pressure (6±1 mbar) representative of the mean conditions at the Mars surface. The studied sample consists of thin uniform layers (micrometric scale) made of pure organics [2], or a mixture of minerals with organics [3], deposited on a ~2 cm diameter magnesium fluoride (MgF_2) optical window. The samples are prepared via sublimation/condensation for pure organics, and evaporation/sedimentation of a minearl-organic suspension when introducing a mineral.

Experiment: In this communication, we present the influence of UV radiation on various pure organic molecules either potentially derived from meteorites (e.g. mellitic acid) or of interest for astrobiology (e.g adenine). We also present the influence of the presence of nontronite, a mineral present on Mars, on the evolution of these molecules. From this result, a discussion about the potential survival of bioindicators or biosignatures from organic origin can be done, as well as heir potential for being detected in sample collected in the regolith of Mars.

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References:

[1] Stalport F. et al. (2008) *Adv. Space Res., 42,* 2014-2018. [2] Poch O. et al. (2013) *Planet. Space Sci., 85,* 188-197. [3] Poch O. et al. (2015) *JGR.*

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