Mass spectrometry investigation of Titan aerosols analogs formed with traces of aromatic compounds T. Gautier[1], J. Sebree[2], X. Li[3], S. Getty[1], V. Pinnick[4] and M.G. Trainer[1], [1] NASA Goddard Space Flight Center, Solar System Exploration Division, Greenbelt, MD 20771, USA (thomas.j.gautier@nasa.gov), [2] University of Northern Iowa, Department of Chemistry and Biochemistry, Cedar Falls, IA 50614, USA, [3]University of Maryland, Baltimore County, Baltimore, MD 21250, [4]CRESST, University of Baltimore, Baltimore, MD, USA

Introduction: The idea that aromatic and heteroaromatic reaction pathways may play an important role in Titan's atmospheric chemistry, especially in the formation of aerosols, has been supported by the detection of benzene at ppm levels in Titan's atmosphere[1] by Cassini's Ion and Neutral Mass Spectrometer (INMS). In laboratory studies it has been shown that aromatic molecules are easily dissociated by ultraviolet radiation and can therefore contribute significantly to aerosol formation [2]. Low concentration of aromatic and/or heteroaromatic molecules (benzene, naphthalene, pyridine, quinoline and isoquinoline) in a N_2-CH_4 mixture can be used to dope the production of aerosol analogs [3].

Preliminary results: In this work we investigate the effect of the chemical nature of the aromatic reactant on the aerosol composition using Laser Desorption Time of Flight mass spectrometry.

We analyse samples prepared with a nitrogen – methane gas mixture with traces of benzene, pyridine, naphatalene or quinoline. Preliminary results show that the aerosol growth patterns depend both on the number of rings and on the nitrogen content of the trace precursor used.

We also perform MS/MS analysis on some prominent peaks of aerosol mass spectra. This allows us to infer some structural identification of species common to all our samples and thus of primary interest regarding Titan aerosol formation pathways. We expect many of the identified molecules to be polyaromatic nitrogen heterocycles (PANH) and potentially the presence of nitrogen bases.

References: [1] Waite et al. (2007) *Science 316*, 870-875 [2] Trainer et al. (2012) *ApJL 766,* L4 [3] Sebree et al. (2014) *Icarus 236*, 146-152