

# Anion Chemistry On Titan: Probing the Destruction Mechanisms of Nitrile Anions by Interaction with Photons

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## Abstract

The aim of this work is to study the interaction with VUV photons of mass-selected negative ions relevant for the understanding of Titan atmosphere. Characterization of their formation [1] and destruction rate is of fundamental importance for modeling Titan ionosphere chemistry and understanding the observations of heavy anions by the CAPS/ELS spectrometer on board of the CASSINI spacecraft. The objective here is to measure their transformation into smaller anions through photodissociation and their destruction through photodetachment. The parent anions  $CN^-$  are produced from  $CH_3CN$  in the APCI source of a commercial mass spectrometer LTQ XL (Thermo Scientific) [2,3] and reacted with  $HC_3N$  in the trap to produce heavier anions through the  $CN^- + x HC_3N \rightarrow (HC_3N)_y C_{2p+1}N^- + z HCN$  processes. These product anions are then mass-selected in the trap and irradiated with VUV photons (5-21 eV) from the DESIRS beamline. Their decay is followed as a function of irradiation time as illustrated in Figure 1.

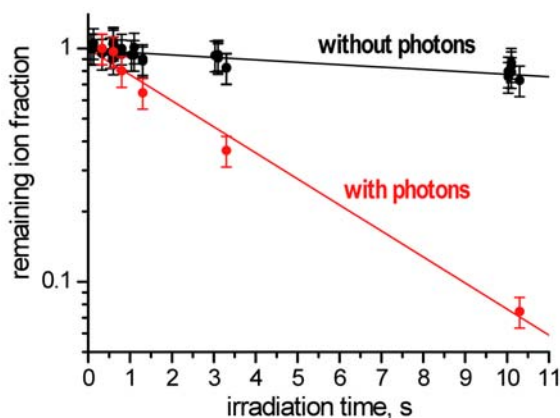


Figure 1: Trap ion induced loss by photodetachment: comparison of the exponential decay of the measured  $(HC_3N)_3C_5N^-$  anion signal as a function of the irradiation time with and without synchrotron light for a photon energy of 8 eV.

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## References

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