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Threshold behavior in metastable dissociation of multi-photon ionized thymine and uracil

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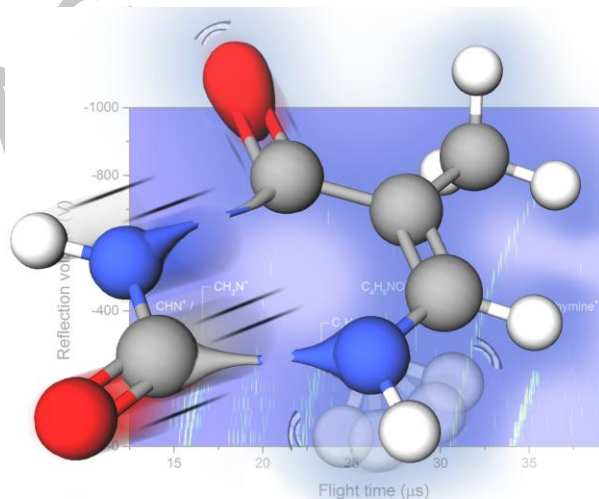
Abstract

Microsecond-timescale HNCO loss has been observed from single-color multi-photon ionized pyrimidine nucleobases in the gas phase. Photon energy thresholds for the metastable channels have been measured at 5.55 ± 0.02 eV for thymine and 5.57 ± 0.02 eV for uracil. We argue that these results can be attributed to accessing the molecules' S_1 states with additional vibrational energy matching the threshold energy for HNCO loss from the radical cation. Combined with previous photoionization energies, this enables the S_1 adiabatic energies to be deduced: 3.67 ± 0.07 eV for thymine and 3.77 ± 0.07 eV for uracil. These values are consistent with recent calculations.

Keywords

Thymine; uracil; pyrimidine nucleobases, metastable fragmentation; multi-photon ionization; mass spectrometry

Graphical abstract



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