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Ionization dynamics of DNA bases are very important by themselves since those provide essential fundamental properties for understanding DNA damage and mutation caused by the exposure to ionizing radiation. And also, the potential application of DNA based molecular devices requires the exact physical properties of bases.

we present the highly resolved ion spectrum of one of DNA bases, thymine, for the first time. The VUV MATI (Vacuum ultraviolet mass-analyzed threshold ionization) spectroscopy gives the accurate and precise ionization potential of 8.9186 eV for thymine in the gas phase. The geometrical change of thymine upon the ionization is also revealed in the MATI spectrum, giving the vibrational frequencies of the thymine cation for the first time. Our first ion spectroscopic work on thymine should be extended to other DNA bases as well as DNA base-pairs and solvated DNA bases. The experimental work along this line will also stimulate the more rigorous theoretical calculations in this important field.

