ULTRAFAST VIBRATIONAL COOLING DYNAMICS IN 9-METHYLADENINE OBSERVED WITH UV PUMP/UV PROBE TRANSIENT ABSORPTION SPECTROSCOPY

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The photodynamics of 9-methyladenine (9MA) following excitation at 266 nm were monitored using femtosecond transient absorption spectroscopy by probing within and near the ground state absorption band (251 nm - 312 nm). The dynamics observed show a large dependence on probe wavelength and were assigned to vibrational cooling of the hot ground state following ultrafast internal conversion from the first singlet excited state. The observed vibrational cooling rates are progressively slower in water ($\tau \sim 2$ ps), deuterated water ($\tau \sim 4$ ps) and acetonitrile ($\tau \sim 15$ ps). The H/D isotope effect as well as the large rate decrease in an aprotic solvent suggests that hydrogen bonds between solute and solvent play an important role in the vibrational cooling process for this molecule.