HIGH-RESOLUTION UV SPECTRA OF BENZENE ISOTOPOMERS AND DIMERS IN HELIUM NANODROPLETS

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We present high-resolution ultraviolet spectra of various benzene isotopomers and their dimers in helium nanodroplets in the region of the first Herzberg-Teller allowed vibronic transition $^1B_{2u} \leftarrow {}^1A_{1g}\ 6_0^1$ (a.k.a. the A_0^0 transition) at $\sim$260 nm. Spectra were recorded in beam depletion and laser-induced fluorescence excitation. Unlike for many larger aromatic molecules, the monomer spectra consist of a *single* "zero phonon" line, blueshifted by about 30 cm^{-1} from the gas phase value. The rotational moments of inertia of C_6H_6 are found to be *at least* 6 or 7 times larger than in the gas phase. The dimers present the same vibronic fine structure (though modestly compressed) as previously observed in the gas phase. The fluorescence lifetime and quantum yield of $(C_6H_6)_2$ are found to be equal to those of C_6H_6, implying substantial inhibition of excimer formation in the dimer in helium nanodroplets.