HIGH RESOLUTION FTIR SPECTROSCOPY OF THE ν_4 BANDS OF C_6H_6 AND C_6D_6

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We have re-examined the ν_4 bands (Herzberg numbering) of C_6H_6 and C_6D_6 using high resolution (0.0015 cm^{-1}) Fourier transform infrared spectroscopy. The spectra were taken with the benzene samples in a temperature stabilized cell (4°C), 20 cm in length. The $-h6$ sample spectrum (99.95 atom % $^{12}C_6$) was recorded with an MCT detector and KBr beamsplitter and the $-d6$ sample spectrum was recorded with a silicon bolometer detector and mylar beamsplitter. For the ν_4 band of C_6H_6, we have fit the following preliminary spectroscopic constants: $\nu_0 = 673.9747(2)\ \mathrm{cm}^{-1}$, $B' = 0.1896388(13)\ \mathrm{cm}^{-1}$, $(C' - B') - (C'' - B'') = 1.709(2) \times 10^{-4}\ \mathrm{cm}^{-1}$, $D'_J = 4.106(60) \times 10^{-8}\ \mathrm{cm}^{-1}$, $D'_K - D''_K = -2.9(9) \times 10^{-10}\ \mathrm{cm}^{-1}$, $D'_{JK} = -6.89(6) \times 10^{-8}\ \mathrm{cm}^{-1}$, $B'' = 0.1897739(10)\ \mathrm{cm}^{-1}$, $D''_J = 4.123(45) \times 10^{-8}\ \mathrm{cm}^{-1}$, $D''_{JK} = -6.94(5) \times 10^{-8}\ \mathrm{cm}^{-1}$. For the ν_4 band of C_6D_6, we have fit the following preliminary spectroscopic constants: $\nu_0 = 496.2086(1)\ \mathrm{cm}^{-1}$, $B' = 0.156919(5)\ \mathrm{cm}^{-1}$, and $B'' = 0.157016(5)\ \mathrm{cm}^{-1}$. Band centers of the observed sequences of hot bands for both isotopic modifications will be reported.