THE SPECTRAL STUDY OF THE OH (ν_1) + CH (ν_3) STRETCH COMBINATION BAND OF JET-COOLED METHANOL

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The rotationally resolved overtone spectrum of the OH (ν_1) + CH (ν_3) stretch combination band of methanol between 6510 and 6550 cm^{-1} has been recorded at sub-Doppler resolution by continuous-wave cavity ringdwon spectroscopy (CW-CRDS). Of 572 recorded lines, 358 lines have been assigned by ground state combination differences, including the 21 subbands with J' = 0-8 and K' = 0-3. The perturbations of E K' = -1, -2, and -3 levels have been observed and deperturbations have been carried out. The torsion-rotational constants in the upper state, obtained by fitting the observed spectrum to the Herbst Hamiltonian, are in a reasonable agreement with the predicted values based on the constants of the fundamental bands, ν_1 and ν_3. This combination band has fewer perturbations than the fundamental ν_1, and the coupling matrix elements are smaller, 0.02 to 0.66 cm^{-1} as compared to 0.35 to 1.6 cm^{-1}.