OBSERVATION AND ANALYSIS OF THE SLIT JET/FTIR SPECTRA OF SOME SMALL DIMERS

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As a demonstration of our cw slit jet/FTIR spectrometer we have recorded and analyzed the jet (T_{rot} = 10 K) spectra of N_2O dimer, N_2O-Ar dimer, CO_2 dimer, and CO_2-Ar dimer in the 2100 to 2400 cm^{-1}region. A Bruker IFS 120HR FTIR spectrometer is used to interrogate the molecular and cluster species in a cw jet formed by the expansion of argon and CO_2 or N_2O through a 12 cm $\times$ 50 μm slit. Preliminary analysis of the N_2O dimer spectrum gives the following constants: A'' = $0.299421(5)$ cm^{-1}, B'' = $0.059928(1)$ cm^{-1}, C'' =$0.049841(1)$ cm^{-1}, Δ''_J = $0.192(3) \times 10^{-6}$ cm^{-1}, Δ''_{JK} = $-0.93(3) \times 10^{-6}$ cm^{-1}, Δ''_K = $0.71(1) \times 10^{-5}$ cm^{-1}, δ''_J = $0.30(9) \times 10^{-7}$ cm^{-1}, δ''_K = $0.7(2) \times 10^{-6}$ $cm^{-1}$and for the upper state A' = 0.299067(4) cm^{-1}, B' = $0.059665(1)$ cm^{-1}, C' = $0.049647(1)$ cm^{-1}, Δ'_J = $0.195(3) \times 10^{-6}$ cm^{-1}, Δ'_{JK} = $-0.96(2) \times 10^{-6}$ cm^{-1}, Δ'_K = $0.712(8) \times 10^{-5}$ cm^{-1}, δ'_J = $0.33(9) \times 10^{-7}$ cm^{-1}, δ'_K = $0.9(1) \times 10^{-6}$ cm^{-1}, and ν_0 = 2229.48295(2) cm^{-1}. The CO_2-Ar dimer spectrum gives the following constants: A'' = $0.397145(3)$ cm^{-1}, B'' = $0.06603456(8)$ cm^{-1}, C'' =$0.05612272(7)$ cm^{-1}, Δ''_J = $0.6221(5) \times 10^{-6}$ cm^{-1}, Δ''_{JK} = $0.12018(3) \times 10^{-4}$ cm^{-1}, Δ''_K = $-0.1055(5) \times 10^{-4}$ cm^{-1}, δ''_J = $0.907(5) \times 10^{-7}$ cm^{-1}, δ''_K = $0.863(2) \times 10^{-5}$ cm^{-1}, H''_{JK} = $-0.51(7) \times 10^{-9}$ cm^{-1}, and for the upper state A' = 0.393988(3) cm^{-1}, B' = $0.066007(2)$ cm^{-1}, C' = $0.056027(1)$ cm^{-1}, Δ'_J = $0.640(4) \times 10^{-6}$ cm^{-1}, Δ'_{JK} = $0.1176(3) \times 10^{-4}$ cm^{-1}, Δ'_K = $-0.1050(4) \times 10^{-4}$ cm^{-1}, δ'_J = $0.97(2) \times 10^{-7}$ cm^{-1}, δ'_K = $0.109(3) \times 10^{-4}$ cm^{-1}, H'_{JK} = $-0.65(9) \times 10^{-9}$ cm^{-1}, and ν_0 = 2348.67306(5) cm^{-1}. Spectroscopic constants for the other dimers will also be presented.