SPECTROSCOPIC LINE PARAMETERS OF HELIUM- AND HYDROGEN-BROADENED $^{12}C^{16}O$ TRANSITIONS IN THE 3–0 BAND FROM 6270 cm^{-1}TO 6402 cm^{-1}.

ZACHARY REED, JOSEPH HODGES, *Chemical Sciences Division, National Institute of Standards and Technology, Gaithersburg, MD, USA*.

We present helium- and hydrogen-broadened linewidths, pressure-induced shifts, and collisional narrowing coefficients for selected lines in the P- and R- branch of the second overtone (3–0) band of CO, spanning from 6270 $\mathrm{cm}^{-1}$to 6402 cm^{-1}. The contribution of speed dependent effects and partial correlation between velocity-changing and dephasing collisions on the foreign broadened line shapes are also discussed. The data were obtained using the frequency-stabilized cavity ringdown spectroscopy technique. Spectra were collected at room temperature over a pressure range from 13.3 kPa to 100 kPa. The spectrum frequency axis is referenced via an optical frequency comb to a Cs clock, which provides pressure shifting values with uncertainties as low as 100 kHz/atm. The spectra exhibited signal-to-noise ratios as high as 20,000:1, which enables rigorous tests of theoretical line profiles through multi-spectrum least squares data analysis. The partially correlated, quadratic-speed-dependent Nelkin Ghatak profile gives a quality of fit mostly commensurate with the high spectrum signal-to-noise and minimizes structural residuals.