Pressure broadening and shift coefficients of the $2\nu_1$ and $(\nu_1+\nu_3+\nu_5)^{1e}$ bands of C_2HD by N_2

C.K. Ayoub[a], M.J. Bello[a], M.J. Blum[a], L.L. Chau[a], M.J. Chen[a], R.J. Hansen[a], J.L. Hardwick[a,b], G.P Harlow[a], Y.Hu[a], H.J.C. Kim[a], C.G. Kirshner-Lira[a], L.M. Kringle[a], L.L. Lai[a], S.M. Marshall[a], J.L. Miller[a], S.M. Mirashrafi[a], D.S. Mitaru-Berceanu[a], X. Pan[a], K.D. Peacock[a], M.A. Pusey[a], L. Singh[a], M.Z.B. Wu[a], Y. Xiao[a], N.B. Zelick[a], and Y. Zhao[a]

[a]Department of Chemistry, University of Oregon, Eugene, Oregon, USA
[b] E-mail: hardwick@uoregon.edu

Pressure broadening and shift coefficients as a function of *J* have been determined using an external cavity tunable diode laser spectrometer for the $2\nu_1$ and $(\nu_1+\nu_3+\nu_5)^{1e}$ bands of acetylene-*d*, C_2HD, between 6490 and 6610 cm^{-1} using N_2 as a buffer gas at 295 K, and these have been compared with results obtained in this laboratory for normal acetylene, C_2H_2. Experimental data have been obtained from 24 experiments, each consisting of 10-20 spectra, for the *P*(30) through *R*(30) lines at buffer gas pressures up to 0.2 atm.

Both the pressure broadening coefficients and the pressure shift coefficients are indistinguishable between the two bands, despite the known dependence of acetylene pressure shifts between bands of ordinary acetylene. Moreover, the pressure broadening coefficients for C_2HD are not statistically different from those of C_2H_2.

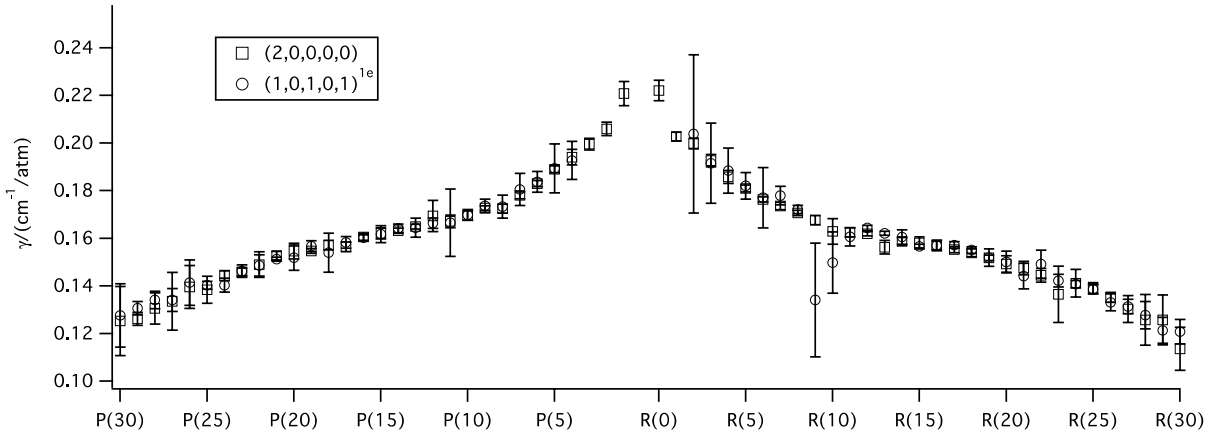

Figure 1. Pressure broadening coefficients (FWHM) for C_2HD broadened by N_2 at room temperature. The data represent median values of several experimental determinations.

Acknowledgement

This work was a class project of the Physical Chemistry Laboratory at the University of Oregon. The authors are grateful to the University of Oregon and the Department of Chemistry Instructional Laboratories for their support. We are grateful for the assistance of Clifford Dax in the design and construction of the detection electronics.