OBSERVATIONS OF INTERSTELLAR C_3 IN TRANSLUCENT SIGHTLINES

T. OKA, J. A. THORBURN, L. M. HOBBS, D. E. WELTY, D. G. YORK, *Department of Astronomy & Astrophysics, The University of Chicago, Chicago, IL 60637*; B. J. MCCALL, *Department of Astronomy, University of California, Berkeley, CA 94720*; S. D. FRIEDMAN and P. SONNENTRUCKER, *Department of Physics and Astronomy, Johns Hopkins University, Baltimore, MD 21218*.

Following the detection of the 000-000 band of the $A^1\Pi_u \leftarrow X^1\Sigma_g^+$ transition of C_3 at 4051.6 Å by Maier and others[a] toward three diffuse sightlines, we have searched for the spectrum toward more reddened stars. Although the lower resolution (R = 37,500) of our spectrometer (ARCES) did not resolve the rotational structure of the spectrum, it allowed us to observe denser clouds toward fainter stars which are expected to contain more carbon molecules. The C_3 spectrum has been observed toward 15 stars with color excesses ranging from E(B-V) = 0.33 to 1.12 and the C_3 column densities were determined by comparing the observed spectra with simulated spectra. The observed C_3 column densities from 10^{12} to 10^{13} cm^{-2} are well correlated with the C_2 column densities indicating their close chemical relation. The formation of C_3 from C_2 will be discussed. The studies of C_3 and C_2 have led us to the revelation of a group of diffuse interstellar bands whose intensities correlate well with the C_3/C_2 column densities[b]. It was also noted that abundances of C_3/C_2 and H_3^+ are completely uncorrelated.

Our non-detection of the 020-000 vibronic band at 3991.6 Å set an upper limit to its Franck-Condon factor and that of C_4 and C_5 set upper limits of their column densities.

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[a] J. P. Maier, N. M. Lakin, G. M. Walker and D. A. Bohlender *Astrophys. J.* **553**, 267, 2001

[b] B. J. McCall et al., this meeting