HIGH-RESOLUTION ROTATIONAL SPECTROSCOPY OF THE CARBON CHAIN ANIONS C_3N^-, C_4H^-, AND C_4D^-

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The rotational spectra of C_3N^-, C_4H^-, and C_4D^- have been observed at high spectral resolution by Fourier transform microwave spectroscopy. For both C_3N^- and C_4D^-, frequencies of the hyperfine components in the lowest-J transitions have been determined to better than 0.1 ppm. The derived quadrapole coupling constants eQq for both anions are in good agreement with theoretical predictions. A number of other properties of these anions, including linewidths and rotational temperatures, have been systematically studied with respect to similar-sized neutral molecules. The production of C_4H^- using different hydrocarbon precursor and buffer gases has also been investigated.