MICROWAVE SPECTRA OF THE METHYLCYANOPOLYYNES
$CH_3(C \equiv C)_nCN$, n=2,3,4,5

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The ground state rotational spectra of four methylcyanopolyynes, $CH_3(C \equiv C)_2CN$, $CH_3(C \equiv C)_3CN$, $CH_3(C \equiv C)_4CN$, and $CH_3(C \equiv C)_5CN$, were measured between 6 and 22 GHz by Fourier transform microwave spectroscopy. For $CH_3(C \equiv C)_2CN$, 8 transitions, each with nitrogen nuclear quadrupole hyperfine structure (hfs), were observed and a value of eqQ = – 4.25(3) MHz was determined for the first time. Twenty-one rotational transitions of $CH_3(C \equiv C)_3CN$, ten rotational transitions of $CH_3(C \equiv C)_4CN$, and eleven rotational transitions of $CH_3(C \equiv C)_5CN$ were detected for the first time and precise values for the rotational, leading centrifugal distortion constants of each molecule, and the nuclear quadrupole coupling constant of $CH_3(C \equiv C)_3CN$ were determined.