SUBMILLIMETER-WAVE LINES OF CN^-

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High resolution spectroscopy of negative ions is still extremely challenging. Recently Gottlieb et al detected the four low lying rotational lines ($J = 1 - 0$ to $J = 4 - 3$) of CN^- by using a glow discharge in a mixture of C_2N_2 and Ar or N_2 [a]. We extended the measurements to higher frequency up to the $J = 7 - 6$ transition at 786 GHz. Various types of electric discharges were explored for a better source of negative ions. As shown by Gottlieb et al, a glow discharge yields reasonable signals without extensive signal accumulation. However, it is found that a "hollow anode" discharge with an axial magnetic field of about 250 Gauss is a better source for CN^-. The molecular constants have been obtained by including newly measured line frequencies.

[a] C. A. Gottlieb, S. Brünken, M. C. McCarthy, and P. Thaddeus, J. Chem. Phys. 126, 191101(2007)