THE PURE ROTATIONAL SPECTRUM OF $CuCH_3$

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The pure rotational spectrum of $CuCH_3$ ($\tilde{X}^1A_1$) has been measured with millimeter-wave direct absorption techniques in the frequency range of 312 to 543 GHz. This work is the first spectroscopic observation of monomeric $CuCH_3$ in the gas-phase. Measurements have been made of the two Cu isotopomers, ^{63}Cu and ^{65}Cu, in the ground and v_3=1 (the Cu-C stretch) vibrational states. Copper monomethyl was formed by the reaction of Cu vapor produced in a Broida-type oven and $Sn(CH_3)_4$. Ten transitions of both isotopomers have been recorded with K components up to 13. Additional work is being conducted on $Cu^{13}CH_3$ and $CuCD_3$. From this data, spectroscopic constants and structural information are being determined. Establishing the geometry of copper monomethyl is significant for organometallic chemistry.