MORE TRANSITION METAL CYANIDES: LABORATORY DETECTION OF CoCN ($X^3\Phi_i$)

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The millimeter-wave spectrum of CoCN has been recorded in the range 350 - 500 GHz using direct absorption methods. This study is the first gas-phase spectroscopic observation of this radical. Eight rotational transitions, consisting of three spin-orbit components, have been measured for CoCN, suggesting that the ground electronic state is $^3\Phi_i$. Each fine structure component is comprised of a well-resolved octet arising from hyperfine interactions of the ^{59}Co (I = 7/2) nucleus. Renner-Teller components of excited vibrational states have also been observed and assignments are in progress. These data indicate that CoCN is most likely linear, with the cobalt atom bonded to carbon. Isotopic substitution is currently underway in order to determine the precise geometry of the molecule.