

Laboratory Rotational Spectroscopy of Astrochemically Interesting Metal Cyanides and Isocyanides

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Abstract

The most common metal-bearing molecules in the interstellar medium are metal cyanides and isocyanides. For example, NaCN, MgCN, MgNC, KCN, and AlNC all have been observed in the circumstellar gas of asymptotic giant branch stars. These findings suggest that other metal cyanides might be present in circumstellar gas. Their detection would have implications for nucleosynthetic processes in stars, as well as for the chemistry in the interstellar medium. Studies are being conducted in the laboratory to measure the rest frequencies of these potential interstellar molecules. The current focus is on transition metal cyanides and isocyanides. We have previously recorded the spectra of CoCN, NiCN, CuCN, and ZnCN. Most recently, we have identified the spectrum of CrCN/CrNC ($X^6\Sigma^+$) in the laboratory, and preliminary work is underway on MnNC ($X^7\Sigma^+$) and FeNC ($X^6\Delta_i$). The most recent results will be presented.

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