

Ph.D. DISSERTATION DEFENSE

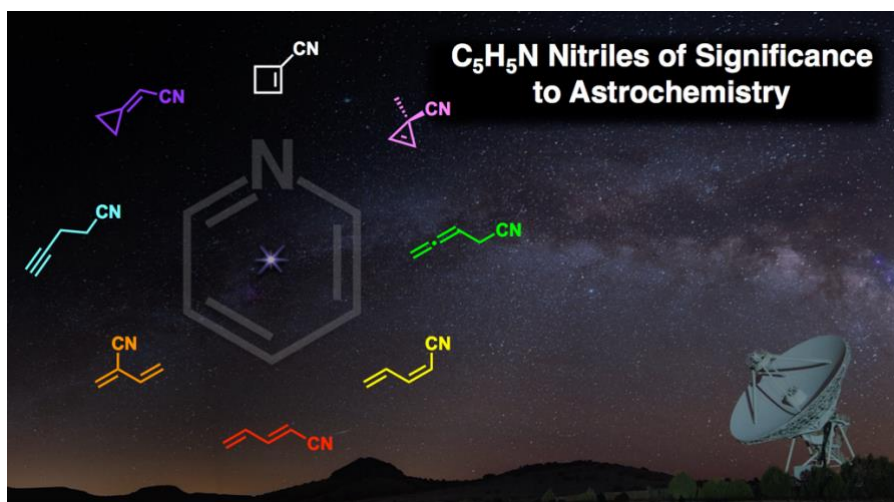
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The Synthesis and Characterization of Astrochemically Significant C_5H_5N Nitrile Isomers

McMahon | Woods Group

Thursday, August 18th at 2 pm, Room 2401 and virtually

<https://uwmadison.zoom.us/j/6815781162>



Over 250 molecular species have been detected in the interstellar medium (ISM) *via* radioastronomy through the observation and assignment of rotational spectra. While relevant to the understanding of the chemical processes of the ISM, the presence of organic molecules in this environment has relevance to astrobiology regarding the origins of organic components critical for life on Earth. The McMahon | Woods group seeks to further develop the library of known celestial molecules by the synthesis and analysis of species theorized to be part of astrochemical systems. Our group has synthesized seven isomeric organic nitriles hypothesized to be present in the ISM and the atmosphere of Saturn's largest moon, Titan. Additionally, these nitriles are isomers of the aromatic heterocycle, pyridine, which has yet to be identified in the ISM. Synthetic methodology for the production and isolation of samples will be presented. The isolation of pure samples of these reactive nitriles enables measurement of their laboratory rotational spectra, which are the critical data needed to search for these species in the cosmos *via* radioastronomy. Impact and importance of the highlighted species to the field of molecular spectroscopy and radioastronomy will be discussed.

