

SPECTROSCOPY AND ASTROCHEMISTRY OF THE CN-TAGGED CYCLIC HYDROCARBONS CYANOCYCLOPENTADIENE AND CYANOINDENE

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The weak, often vanishing, dipole moments of polycyclic aromatic hydrocarbons pose a challenge to exploring their interstellar chemistry through radio astronomy. Functionalization of a pure hydrocarbon with a highly polar nitrile ($-\text{CN}$) group yields a useful proxy, so long as the spectroscopy and chemistry of such CN-tagged molecules are well understood. In this talk, we present recent laboratory measurements of the CN-substituted cyclic hydrocarbons cyanocyclopentadiene, $\text{C}_5\text{H}_5\text{CN}$, and cyanoindene, $\text{C}_9\text{H}_7\text{CN}$, produced in a discharge expansion source and probed by cavity-enhanced Fourier transform microwave spectroscopy. We discuss the role that resonantly stabilized radical intermediates play in the likely formation chemistry of these species and the astrochemical implications of their abundances in the cold, dense molecular cloud TMC-1.