

THE EXCITATION, ABUNDANCE, AND DISTRIBUTION OF MgC_2 AND CaC_2 IN IRC+10216

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The laboratory and astronomical discovery of the metal dicarbides, MgC_2 and CaC_2 , discussed in the preceding talk represents a key advance in the study of metal carbides and fills a longstanding gap in the molecular inventory of evolved carbon stars. In this talk we will discuss how characterizing the distribution of the two species in IRC+10216, together with a careful analysis of their excitation and abundance might help elucidate the role of metals in the chemistry of IRC+10216, and the state of refractory elements in carbon-rich circumstellar environments more generally. We will also discuss the utility of dicarbides as physico-chemical probes^a of circumstellar regions, as well as the prospects of detecting larger metal-carbon compounds there.

^aPossessing dipole moments of nearly 8 D and 11 D, MgC_2 and CaC_2 are among the most polar molecules detected in IRC+10216, and consequently strong discriminators between radiative and collisional excitation processes.