

LABORATORY AND ASTRONOMICAL DETECTION OF RHOMBOIDAL SiC₃

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The rotational spectrum of rhomboidal SiC₃ in its ¹A₁ electronic ground state was measured in a laboratory discharge of silane and acetylene by Fourier transform microwave spectroscopy and direct absorption millimeter wave spectroscopy. A full structure derived from observations of isotopically substituted species shows that SiC₃ has a planar geometry with C_{2v} symmetry that consists of atoms in the shape of a distorted four-member ring and a transannular carbon-carbon bond. Following the laboratory detection, seven rotational transitions of SiC₃ near 100 GHz were detected in the circumstellar envelope of the evolved carbon star IRC+10216 using the NRAO 12 meter telescope.