LABORATORY AND ASTRONOMICAL DETECTION OF RHOMBOIDAL SiC_3

A. J. APPONI, M. C. McCARTHY, C. A. GOTTLIEB and P. THADDEUS, *Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138.*

The rotational spectrum of rhomboidal SiC_3 in its $^1A_1$ 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 SiC_3 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 SiC_3 near 100 GHz were detected in the circumstellar envelope of the evolved carbon star IRC+10216 using the NRAO 12 meter telescope.