LABORATORY DETECTION OF LINEAR SiC_nS (n=2-4, 6)

M. E. SANZ, M. C. McCARTHY, *Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge, MA 02138 and Division of Engineering and Applied Sciences, Harvard University, 29 Oxford St., Cambridge, MA 02138, USA*; P. BOTSCHWINA, *Institut für Physikalische Chemie, Universität Göttingen, Tammannstr. 6, D-37077 Göttingen, Germany*; AND P. THADDEUS, *Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge, MA 02138 and Division of Engineering and Applied Sciences, Harvard University, 29 Oxford St., Cambridge, MA 02138,USA*.

The linear singlet chains SiC_2S, SiC_4S and SiC_6S, as well as the triplet SiC_3S, have been detected among the products of a laboratory discharge on the basis of high level coupled cluster ab-initio calculations and characterized by Fourier transform microwave spectroscopy. The molecules were generated in a supersonic expansion of diluted mixtures of silane, diacetylene and carbon disulfide in Ne. Their rotational and centrifugal distortion constants were accurately determined, as was the spin-spin coupling constant λ for triplet SiC_3S. The microwave spectra of the ^{29}Si, ^{34}S and both ^{13}C isotopic species of SiC_2S were measured, allowing a determination of the individual bond lengths. In addition, several satellite lines were observed near the rotational transitions of SiC_2S, which were identified as belonging to different bending and stretching vibrational excited states.