THE ROTATIONAL SPECTRA OF S_3 AND S_4

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Following the initial detection of the pure sulfur clusters S_3 and S_4 at centimeter wavelengths by Fourier transform microwave spectroscopy[a], S_3 has subsequently been observed at millimeter wavelengths. Thirteen spectroscopic constants reproduce over 60 transitions of S_3 between 9 and 460 GHz (with $J \leq 87$ and $K_a \leq 7$) to within the measurement uncertainties. From these the frequencies of the astrophysically relevant lines of S_3 can be calculated to about 1 part in 10^7 up to 500 GHz, allowing deep searches in the atmosphere of Io, dense molecular cores, and circumstellar shells of late-type stars with existing millimeter- and submillimeter-wave telescopes.

[a]M. C. McCarthy, S. Thorwirth, C. A. Gottlieb, and P. Thaddeus, *J. Am. Chem. Soc.*, in press.