

THE VISIBLE SPECTRUM OF Si₃

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We report the first recording of the visible spectrum of gas-phase Si₃. A cold molecular beam sample was produced by skimming the output of a pulsed discharge source. The 545-490 nm spectral region was examined using both mass-selected REMPI and pulsed dye laser excitation with LIF detection. Dispersed fluorescence and lifetime measurements of numerous bands were recorded. The spectrum has an origin at 18600 cm⁻¹ and a progression in the symmetric stretch with a harmonic frequency of 445 cm⁻¹. The bands are assigned to the 1³A₁''- \tilde{a} A₂' transition of the D_{3h} isomer based upon new and previous^a predictions. A vibrational progression observed in the dispersed fluorescence having a spacing of 505 cm⁻¹ is in agreement with previous ZEKE studies^b. An additional vibrational progression observed in dispersed fluorescence having a spacing of 173 cm⁻¹ is in agreement with the bending frequency for the \tilde{X}^1 A₁ state of the C_{2v} isomer estimated from the pure rotational spectrum.^c

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^cM. C. McCarthy and P. Thaddeus *Phys. Rev. Lett.* **90**, 213003 (2003)