THE VISIBLE SPECTRUM OF Si_3

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We report the first recording of the visible spectrum of gas-phase Si_3. 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 $1^3A_1''$- $\tilde{a}A_2'$ 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 $\tilde{X}^1A_1$ state of the C_{2v} isomer estimated from the pure rotational spectrum.[c]

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[b] C. C.Arnold and D. M. Neumark *J. Chem. Phys.* **100**, 1797 (1994)
[c] M. C.McCarthy and P. Thaddeus *Phys.Rev. Lett.* **90**, 213003 (2003)