LASER-INDUCED PHOSPHORESCENCE OF SO_2 IN SOLID NEON : DIRECT OBSERVATION OF THE $b\ ^3A_2$ STATE

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Dispersed phosphorescence spectra of the transition $a\ ^3B_1$ - $X\ ^1A_1$ of ^{18}O-labeled SO_2 in solid Ne were recorded in the spectral region 388-478 nm during laser excitation. As zero-phonon lines are well resolved, we were able to identify all three vibrational modes of the $X\ ^1A_1$ state, and to monitor emission from a specific isotopomer (in particular $^{16}OS^{18}O$) to obtain its corresponding excitation spectra. The vibronic patterns of excitation spectra of $S^{16}O_2$ and $S^{18}O_2$ in the spectral range 351-388 nm are similar to those observed in the gaseous phase, with severely perturbed lines above $a\ ^3B_1$ (110) at 27005 cm^{-1}. New lines in two groups were observed for $^{16}OS^{18}O$; they are identified as lines associated with the ν_3 of $a\ ^3B_1$ and of $b\ ^3A_2$. These observations enable us to report ν_3 = 922 cm^{-1} for $a\ ^3B_1$, ν_2 = 315 and ν_1 = 771 cm^{-1} for $b\ ^3A_2$, and a false origin at 26653 cm^{-1} for the $b\ ^3A_2$ (001) - $X\ ^1A_1$ (000) transition of $^{16}OS^{18}O$.