FOURIER TRANSFORM EMISSION SPECTROSCOPY AND AB INITIO CALCULATIONS ON WO

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The emission spectra of WO have been observed in the $4000 - 30000$ cm^{-1} region using a Fourier transform spectrometer. WO was produced by exciting a mixture of WCl_6 vapor and He in a microwave discharge lamp. A $^3\Sigma^-$ state has been assigned as the ground state of WO based on a rotational analysis of the observed bands and ab initio calculations. After rotational analysis, the majority of strong bands have been classified into three groups. Most of the transitions belonging to the first group have an $\Omega = 0^+$ state as the lower state while the bands in the second group have an $\Omega = 1$ state as the lower state. These two lower states have been assigned as X0$^+$ and X1 spin components of the $X^3\Sigma^-$ ground state of WO. The third group consists of additional bands interconnected by common vibrational levels involving some very low-lying states. The spectroscopic properties of the low-lying electronic states have been predicted by ab initio calculations. The details of the rotational analysis are presented and an attempt has been made to explain the experimental observations in the light of the ab initio results.