ELECTRONIC TRANSITIONS OF RUTHENIUM MONOXIDE

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The electronic transition spectrum of ruthenium monoxide (RuO) molecule in the spectral region between 545nm to 640nm has been recorded and analyzed using laser ablation/reaction free-jet expansion and laser induced fluorescence spectroscopy. The RuO molecule was produced by reacting laser- ablated ruthenium atoms with N_2O seeded in argon. Nine vibrational bands were recorded and they are identified to be belonging to four electronic transition systems, namely the [18.1]Ω = 4 - $X^5\Delta_4$ transition, [16.0]$^5\Phi_5$ - $X^5\Delta_4$ transition, [18.1]Ω = 3 - $X^5\Delta_3$, and [15.8] $^5\Phi_4$ - $X^5\Delta_3$ transition. RuO has been determined to have a $X^5\Delta_4$ ground state. A least squares fit of the measured rotational lines yielded molecular constants for the ground and the low-lying electronic states. A molecular orbital energy level diagram has been used to help with the assignment of the observed electronic states.