FREQUENCY MODULATION SPECTROSCOPY OF THE TiO E-X TRANSITION

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Frequency modulation spectroscopy has been successfully used to measure the spectra of jet-cooled transition-metal containing radicals. This paper reports the recent results on the $E^3\Pi$-$X^3\Delta$ (0,0) and (1,0) bands of TiO. This band system is known to be 10 times weaker than the B-X or A-X bands and illustrates the high sensitivity of our spectrometer. TiO radicals were generated by the reaction of laser-ablated metal atoms with O_2 or CO_2 seeded in a supersonic expansion of Ar. All 3 sub-bands of the (0,0) band were recorded at high resolution and previously unresolved lamda-type doubling of Ω=1 of the upper state was also resolved. More precise and some previously undetermined molecular constants are now available. The still weaker (1,0) band was also observed and an equilibrium bond length in the $E^3\Pi$ was determined.

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