OPTICAL STARK SPECTROSCOPY OF MOLYBDENUM CARBIDE, MoC

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High resolution optical spectroscopy has been used to study a molecular beam of molybdenum carbide, MoC. The $R_e(0)(\nu = 18612.978\mathrm{cm}^{-1})$ and $Q_{fe}(1)(\nu = 18611.872\mathrm{cm}^{-1})$ branch features of the (0,0) $[18.6]^3\Pi_1 - X^3\Sigma^-$ system of ^{98}MoC were analyzed using Stark spectroscopy. Electric field induced splitting in the laser induced fluorescence (LIF) spectra was analyzed to measure permanent electric dipole moments of 2.69(2)D and 6.32(20)D for the $[18.6]^3\Pi_1$ and $X^3\Sigma^-$ states, respectively. Excited state hyperfine structure has been observed for the first time in ^{95}MoC and ^{97}MoC. Experimental results will be compared to theoretical predictions, [a] and the electronic structure will be discussed using a molecular orbital correlation model. The MoC dipole moments will be compared with those of other transition metal monocarbides. An interesting observation is that the *ab initio* calculations for second row transition metal monocarbides are more reliable than predictions for the first row carbides.

[a] I. Shim and K. A. Gingerich *J. Chem. Phys.* **106**, 8093 (1997).