THE PERMANENT ELECTRIC DIPOLE MOMENTS OF IRON MONOCARBIDE

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Iron monocarbide is the most thoroughly studied transition metal carbide. Here, we report on the study of numerous branch features in the (0,0) $[12.0]\Omega = 2 \leftarrow X^3\Delta_3$ and (0,0) $[13.1]^3\Phi_4 \leftarrow X^3\Delta_3$ band systems using high-resolution optical Stark spectroscopy. These intense band systems have been characterized very recently.[1,2] The electric field induced splitting was analyzed to produce values for the permanent electric dipole moments, μ, of 4.02(6) D, 4.44(6) D and 2.36(3) D for the $[12.0]\Omega = 2$, $[13.1]^3\Phi_4$, and $X^3\Delta_3$ states, respectively. A comparison with other iron containing diatomic molecules and theoretical predicted values is made. The recent finite field *ab initio* prediction[3] of μ is in reasonable agreement with the value of $\mu(X^3\Delta)$. Earlier calculations,[4] which employed an expectation value approach, are in poor agreement with the current experiment.

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