ON THE STARK EFFECT IN OPEN SHELL COMPLEXES EXHIBITING PARTIALLY QUENCHED ELECTRONIC ANGULAR MOMENTUM

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The Stark effect is considered for polyatomic open shell complexes that exhibit partially quenched electronic angular momentum. Specifically, a zero-field model Hamiltonian is employed that accounts for the partial quenching of electronic orbital angular momentum in hydroxyl radical containing molecular complexes.[a,b] Spherical tensor operator formalism is employed to derive matrix elements of the Stark Hamiltonian in a parity conserving, Hund's case (a) basis for the most general case, in which the permanent dipole moment has projections on all three inertial axes of the system. Ro-vibrational transition intensities are derived, again for the most general case; namely, the laser polarization is projected onto axes parallel and perpendicular to the Stark electric field, and the transition dipole moment vector is projected onto all three inertial axes in the molecular frame. The model discussed here is compared to experimental spectra of OH-(C_2H_2), OH-(C_2H_4), and OH-(H_2O) complexes formed in He nanodroplets.

[a]M. D. Marshall and M. I. Lester, J. Chem. Phys. 121, 3019 (2004).

[b]G. E. Douberly, P. L. Raston, T. Liang, and M. D. Marshall, J. Chem. Phys. in press