STARK EFFECT IN X_2Y_4 MOLECULES : APPLICATION TO ETHYLENE

M. ROTGER, W. RABALLAND, V. BOUDON, M. LOETE, *Laboratoire de Physique de l'Université de Bourgogne, UMR CNRS 5027, 9, av. Alain Savary, B.P. 47870, F-21078 Dijon Cedex, France*; J. BREIDUNG, W. THIEL, *Max-Planck-Institut für Kohlenforschung, Kaiser-Wilhelm-Platz 1, D-45470 Mülheim an der Ruhr, Germany*.

We present a development of the dipole moment and polarizability operators of X_2Y_4 molecules, using a tensorial formalism[a,b] analogous to the one developed for tetrahedral and octahedral molecules[c]. These operators are involved in the calculation of the intensities of rovibrational transitions as well as in the calculation of the Stark effect. Expressions for the matrix elements are derived. A model for the study of the Stark effect in isolated bands of such molecules is proposed and has been used to predict the Stark spectra of the ν_{12} band of ethylene. Values of the polarizability coefficients have been calculated using *ab initio* methods.

[a] W. Raballand, M. Rotger, V. Boudon and M. Loëte, *J. Mol. Spectrosc.* **217**, 239-248, (2003)

[b] Ch. Wenger, W. Raballand, M. Rotger and V. Boudon, *J. Quant. Spectrosc. Radiat. Transfer*, accepted, (2005).

[c] V. Boudon, J.-P. Champion, T. Gabard, M. Loëte, F. Michelot, G. Pierre, M. Rotger, Ch. Wenger and M. Rey, *J. Mol. Spectrosc.* **228**, 620-634, (2004).