SPECTROSCOPY OF X_2Y_4 (D_{2h}) MOLECULES: TENSORIAL FORMALISM ADAPTED TO THE $\mathbf{O(3)} \supset \mathbf{D_{2h}}$ CHAIN, HAMILTONIAN AND TRANSITION MOMENT OPERATORS. APPLICATION TO THE ν_{12} and ν_2 BANDS OF C_2H_4.

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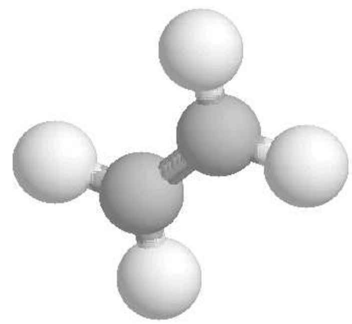
A tensorial formalism adapted to the case of X_2Y_4 asymmetric molecules[a] with D_{2h} symmetry has been developed in the same way as in the previous works on XY_4 (T_d) and XY_6 (O_h) spherical tops[b], XY_5Z (C_{4v}) symmetric tops[c,d] or XY_2Z_2 (C_{2v}) asymmetric tops[e]. We use the $\mathbf{O(3)} \supset \mathbf{D_{2h}}$ group chain. The method is similar to that already outlined by Sartakov *et al.*[f]. All the coupling coefficients and formulas for the computation of matrix elements are given for this chain. Such relations are then expressed in the D_{2h} group itself. We also present a development of the Hamiltonian, dipole moment, and polarizability operators for this type of molecules. Expressions of the matrix elements are derived for these operators.
Two preliminary applications are presented. One concerns the infrared active ν_{12} band of the C_2H_4 molecule and the other the Raman active ν_2 band.



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