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, \(XY\_5Z\) (\(C\_{4s}\)) symmetric tops\(^d,e\) or \(XY\_2Z\) (\(C\_{2h}\)) asymmetric tops\(^f\). We have then constructed a Stark Hamiltonian using the same principle. This model allows the calculation of Stark shifts and splittings in the spectra of \(D\_{2h}\) molecules. Preliminary predictions will be shown for some rovibrational bands of the C\(_2\)H\(_4\) molecule.