

Homework #3

Assigned: 22.11.2019

Deadline: 6.12.2019

Infrared and Raman spectra of sulfur hexafluoride

1. (0 points) Determine symmetry group of SF₆ molecule.
2. (10 points) Determine according to which IRREPs transform normal vibrational modes of the molecule.
3. (5 points) Find out which fundamental transitions are visible in the infrared spectrum and which modes are active in the Raman scattering.
4. (5 points) Which vibrational modes correspond to changes of bond angles without changing bond lengths?
5. (bonus 10 points) In the basis of displacements of atoms from their equilibrium positions, find explicit form of normal coordinates forming the basis of some two-dimensional IRREP of the symmetry group. Sketch corresponding vibrational movements of the molecule.

Bonus points are truly extra – in this assignment you can reach up to 150% success rate.