Chemical Applications of Group Theory

CHEM602

Instructor: Ralf I. Kaiser
ralfk@hawaii.edu

Time: Friday, 1:00 pm – 5:00 pm, Bilger 242
Location: Bilger Hall 242, Department of Chemistry

Outline

1. Definition & Theorems of Group Theory
2. Molecular Structure & Point Groups
3. Reducible & Irreducible Representations
4. Group Theory & Quantum Mechanics: Transition Dipole Moment Operator
5. Derivation of Molecular Orbitals via Projection Operators
6. Molecular Rotations: Microwave Spectroscopy
7. Molecular Vibrations: Vibrational Spectroscopy
8. Electronic States: Visible and Ultraviolet Spectroscopy (organic molecules, coordination compounds, Tanabe Sugano Diagrams)

Required Textbooks: Molecular Symmetry and Group Theory, Alan Vincent (Wiley)
Chemical Applications of Group Theory, F. Albert Cotton (Wiley)

Grading: One midterm (30 %), presentation (20 %), quizzes (20 %), and one final (30 %). To reinforce the material off the class, a short (15 – 20 minutes) quiz will be administered for each lecture. There will be no make-up exams. Class attendance is mandatory. For **each** missed class, your GPA will be lowered by 0.2. Excuses will be accepted only with a documented signature from a physician.