

Kinetics of chemical reactions

Lecture course for PhD students (30 hours)

by dr hab. Adam Kubas (akubas@ichf.edu.pl)

Course synopsis

1. The rates of chemical reactions and integrated rate laws (2 h)
2. Determination of reaction rates: concentration and temperature effects (2h)
3. Basic concepts in reaction mechanisms: (2 h)
 - Elementary reactions
 - Steady State Approximation (SSA)
 - Rate Determining Step (RDS)
4. Examples of reaction mechanisms: (2 h)
 - Unimolecular reactions
 - Chain reactions
 - Polymerization
 - Autocatalytic reactions
5. Kinetics of photochemical and enzymatic transformations (2h)
6. Molecular interpretations of kinetic phenomena (4 h)
 - Collision theory
 - Transition-state theory
 - Tunneling effects in chemistry
7. Dynamics of molecular collisions from experiment and theory (3 h)
8. Electron transfer reactions (2 h)
9. Processes at surface (2 h)
10. Kinetics of catalytic reactions (3 h)
11. Computer-assisted kinetic simulations (2 h)
12. Problem solving and Q&A sessions (2 h)
13. Course summary, examination (2 h)