

Tutorial 6

CSO203: Inorganic Molecules, Materials & Medicines

1. Define supramolecular chemistry. How does it differ from classical molecular chemistry? Discuss with examples.
2. What are non-covalent interactions? Classify them with examples.
3. Explain why many weak van der Waals interactions together can become significant.
4. Why does hydrogen bonding decrease the stretching frequency of a functional group (say carbonyl) in FT-IR spectra? Discuss with examples.
5. Explain why water inside a hydrophobic cavity is energetically unstable. Discuss with examples.
6. Describe the lock-and-key model. What are its limitations? Compare and contrast the induced fit and conformational selection models.
7. Why is the binding constant called a thermodynamic equilibrium constant?
8. Distinguish between stepwise and overall binding constants in multi-site binding.
9. Explain why ethylenediamine (en) complexes are more stable than ammonia complexes, even though both bind through nitrogen donors.
10. Using the concentrations $[A] = 5 \text{ M}$, $[B] = 4 \text{ M}$, $[C] = 10 \text{ M}$, calculate the binding constant, K_a . Write the expression for the dissociation constant K_d .
11. How many pentagons and hexagons are present in C_{60}