

## CH 402: Inorganic Chemistry I (3-1-0: 4)

### Chemical Bonding

LCAO-MO methods in homo and heteronuclear diatomic molecules, bonding in triatomic molecules, VSEPR theory, hybridization, Walsh diagram, Bent's rule, structure and reactivity of covalently bonded molecules

Atomic and ionic radii–bond length, bond strength. Hydrogen bonding interactions, effect of hydrogen bonding and other chemical forces on melting, boiling and solubility.

### Acid Base and Redox Chemistry

Acid-Base concepts, measure of acid-base strengths, acid-base in water, hard and soft acids and bases, application of HSAB principle; Non-aqueous solvent, aprotic solvent and super acids; Solid acid and base catalysis.

Standard electrode potential, pH dependent of electrode potential, stability of metal ions in water, Latimer and Frost diagrams.

### Main-Group Chemistry

Bonding in non-transition element compounds–boranes, carboranes, metalloboranes and metallocarboranes, S–N, Se–N and P–N compounds, aluminosilicates, zeolites, clays and molecular sieves; halogen and noble gas chemistry.

### Bio-inorganic Chemistry

Inorganic elements in biological systems, metalloporphyrins, dioxygen binding, transport and utilisation, model compounds for oxygen carriers; Electron transfer complexes (Ferredoxins and Rubredoxins), photosynthesis, Active transport of cations across membranes, Na<sup>+</sup>/K<sup>+</sup> pump, heavy metal toxicity and chelate therapy.

### References:

1. Inorganic Chemistry: Principles of structure and reactivity–J.E. Huheey, E.A. Keiter, R.L. Keiter, Pearson Education.
2. Advanced Inorganic Chemistry– F.A. Cotton, G. Wilkinson, C.A. Murillo and M. Bochmann, Wiley-Interscience.
3. Concise Inorganic Chemistry– J. D. Lee, Oxford University Press.