

1- Chemistry in non-aqueous solvent

Common non-aqueous solvents , Amphoteric behavior, the coordination model , chemistry in liquid ammonia , ammonium reaction , ammonolysis reaction , metathesis reaction , acid-base reaction , metal-ammonia solution , liquid hydrogen fluoride , liquid sulfur dioxide , chemistry in ethanoic acid , liquid dinitrogen tetroxide N_2O_4

2- Acid base chemistry

History, Major Acid , Base concepts , Arrhenius concepts, Bronsted-lowry concept , solvent system concept, Lewis concept, Frontier Orbitals and acid-base reactions , Hydrogen bonding , Electronic spectra (Including charge transfer)

3- Hard and soft acids and bases

Theory of hard and soft acids and bases , Quantitative mechanism

4- Acids and bases strength

Measurement of acid base interactions , thermodynamic measurements , proton affinity , acidity and basicity of binary hydrogen compounds , inductive effects , strength of oxy-acids , acidity of cations in aqueous solution , steric effects , solvation and acid-base strength , non-aqueous solvent and acid base strength , super acids

5- Polyoxo compounds formation

Polymerization of aqua ions to polycations , poly oxoanions , Heterogeneous acid-base reaction

References

- 1- G. L Missler and D A Tarr " Inorganic chemistry " 3rd edition
- 2- D F Shriver , P Atkins and C H Langford 2nd edition " Inorganic chemistry". chapter 5"