

HSAB THEORY:

It is a qualitative concept introduced by Pearson to explain the stability of metal complexes and the mechanism of their reactions.

Acc/. to this theory, Lewis acids and bases can be further divided into hard (or) soft acids and bases.

Hard Lewis Acids:

Characteristics:

Small size, highly charged cations. High positive charge, empty orbitals in their valence shells, low electronegativity & low electron affinity,

likely to be strongly solvated & low polarisability.
Ex: H^+ , Li^+ , K^+ , Ca^{2+} , Al^{3+} , BF_3 , $AlCl_3$, CO_2 , SO_3 etc.

Soft Lewis Acids:

Characteristics:

Large ionic radii, low positive charge,

completely filled atomic orbitals, readily polarisable

Ex: Cu^+ , Au^+ , Hg^+ , Pt^{2+} , BH_3 , Br_2 , I_2 etc.

Hard Lewis Bases:

Characteristics:

Small ionic radii, highly electronegative, weakly polarizable, strongly solvated

Ex: F^- , OH^- , NH_3 , H_2O , SO_4^{2-} , PO_4^{3-} etc.

Soft Lewis Bases:

Characteristics:

Large ionic radii, intermediate electronegativity, highly polarizable,

Ex: H^- , R^- , CO , SCN^- , C_6H_6 , RNC .

HSAB Principle:

Acc. to HSAB concept, hard acids prefer binding to hard bases to give ionic complexes whereas soft acids prefer binding to soft bases to give covalent complexes.

The large electronegativity differences between hard acids & hard bases give rise to strong ionic interactions.

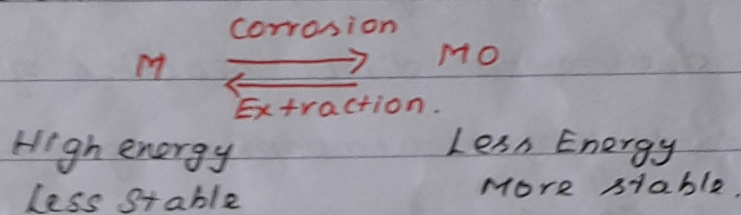
The electronegativities of soft acids and soft bases are almost same and hence have less ionic interactions. i.e. the interactions

between them are more covalent.

The interaction between H.A - S.B (or) S.A - H.B are mostly less stable.

Corrosion :-

It simply means, reverse of extraction of metals.



Definition :-

Any process of destruction and consequent loss of solid metallic material through an unwanted chemical (or) electrochemical attack by its environment, starting at its surface is called corrosion.

- Ex: 1. Rusting of Fe when exposed to atmosphere.
 2. Formation of green film of basic carbonate ($\text{CuCO}_3 + \text{Cu(OH)}_2$) on the surface of Cu, when exposed to moist air containing CO_2 .