

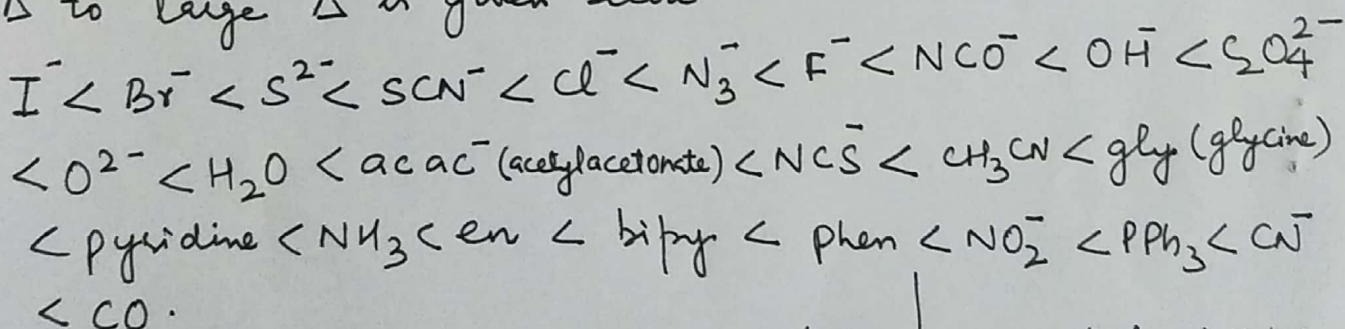
Spectrochemical series :-

(Strong field & weak field ligands)

The magnitude of Δ_o ~~det~~ (CFSE) depends upon various factors one of which is nature of ligands. Some ligands produce greater crystal field splitting (Δ_o) than the other ligands. Such ligands are called strong field ligands or strong ligands while other produced lesser ligand field splitting and are called as weak field ligands or weak ligands. On the basis of crystal field splitting some common ligands have been arranged in the order of their power to cause splitting of d-orbitals from study of their effects on spectra of transition metal ions. This order is called Spectrochemical series.

The spectrochemical series was first proposed in 1935 based on the results of absorption spectra of cobalt complexes.

A partial spectrochemical series listing of ligands from small Δ to large Δ is given below



Ligands arranged on the left end of this spectrochemical series are generally regarded as weaker ligands & cannot cause forcible pairing of electrons within the 3d level, and thus form outer orbital Octahedral complexes that are high spin. On the other hand, ligands lying at the right end are stronger ligands and form inner orbital Octahedral complexes after forcible pairing of electrons within 3d level and hence are called low spin ligands.

* en = ethylenediamine
bipy = 2,2'-bipyridine.
phen = 1,10-phenanthroline