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p. 348 - graph of 4s vs 3d subshell energies

$Ti: [Ar]4s^2 3d^2$ $Ti^+: [Ar]4s^1 3d^2$

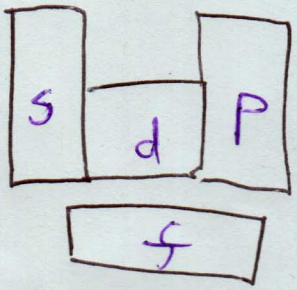
Even though the 4s orbital fills first because it is initially lower in energy than the 3d subshell, once it is filled, the 4s subshell becomes higher in energy, so the 4s electrons come off before the 3d electrons.

Oxidations states: most common: +2

Since the ns electrons are higher in energy than the (n-1)d electrons, a common ion that is formed comes from the loss of these two electrons.

n = energy level of element

$Cu: [Ar]4s^1 3d^{10}$ $Cu^+: [Ar]3d^{10}$



s-block + p-block = main groups

Periodic trends of main group elements

left → right radius decreases

because the increase in protons counters the increase in e^-

top → bottom radius increases

because an additional energy level is added

In transition metals, from left to right, e^- are added to inside orbitals (not valence orbitals), so the shielding effects are greater: This causes the size of transition metals to remain relatively constant as # of protons + electrons increases.

Transition metal complexes

counter ion → $K_2[Co(NH_3)_2Cl_4]$ ← inside brackets, part of the complex

Counter ion – A non-reactive ion that is present only to balance charge and is <u>not</u> covalently bound to the complex.

$$K_2[Co(NH_3)_2Cl_4]_{(s)} \xrightarrow{H_2O} 2K^+_{(aq)} + [Co(NH_3)_2Cl_4]^{-2}_{(aq)}$$

ligands

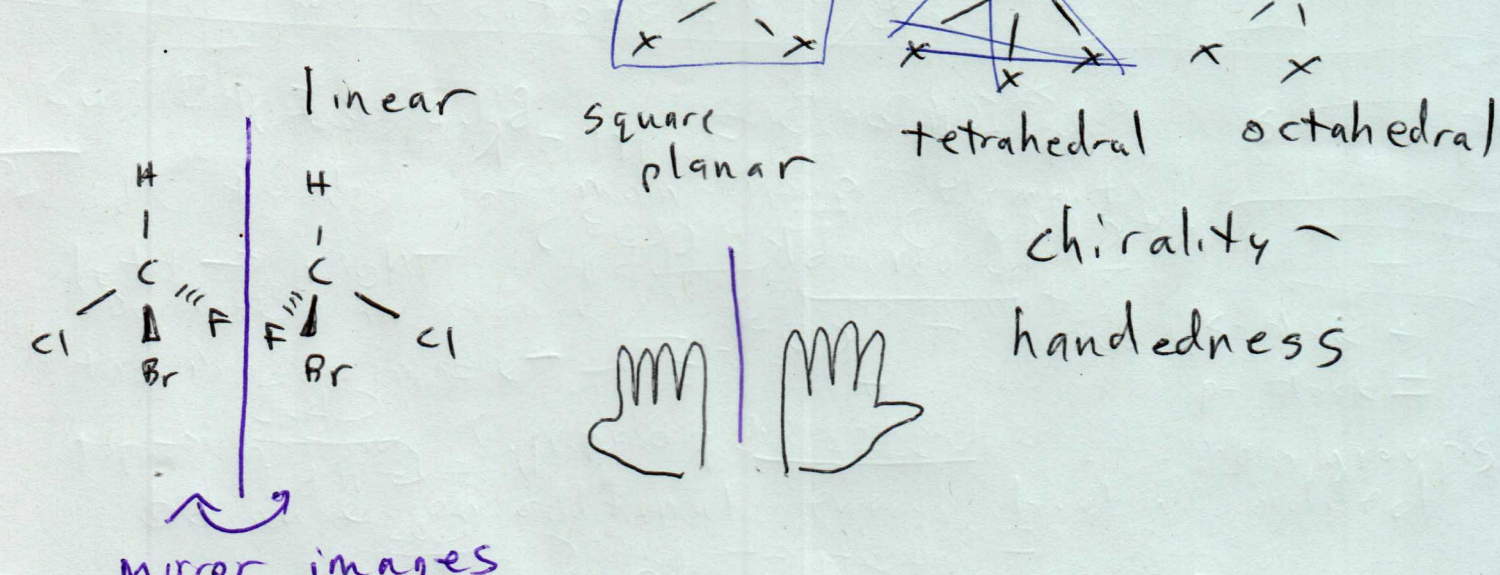
+2

Since the ion is -2 charge, and each Cl^- is -1, Co must be +2

Coordinate covalent bond – a covalent bond in which both e^- in bond come from the ligand.

Ligand – a small molecule that attaches to a transition metal at one or more points.

Geometry:



chirality – handedness

d_{xz} d_{z^2} $d_{x^2-y^2}$