

Coordinate Covalent Bonds: one species donates both electrons to the bond

Transition metals can behave like Lewis Acids (electron pair acceptors) in the formation of what are called **complex ions**. A **coordination compound** typically consists of a complex ion and counter ion.

The molecules or ions that surround the metal in a complex ion are called **ligands**. The ligands act like a Lewis Base in that they donate a pair of electrons. A ligand must therefore have at least one unshared pair of electrons. The type of bond between the metal and the ligand is a **coordinate covalent bond**. In a coordinate covalent bond, one of the bonding atoms supplies both of the electrons.

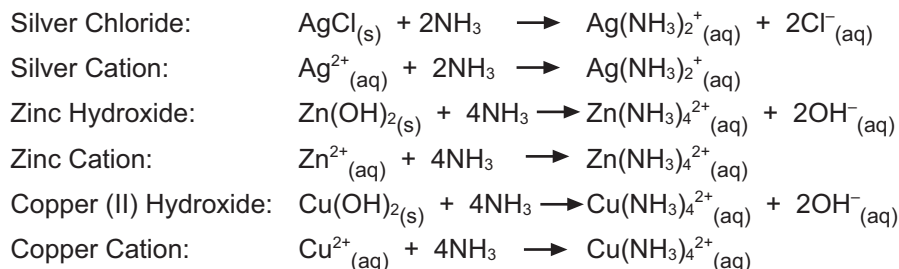
The atom in a ligand that is bound to the metal is called the donor atom. The coordination number is defined as the number of donor atoms surrounding a metal in a complex ion.

Here are some molecules that commonly act as ligands:

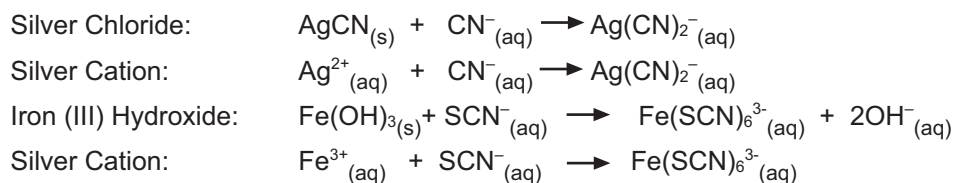


Here are some common examples of complexation reactions (not balanced):

A. Ammine Complexes--concentrated or excess ammonia added to:



B. Cyanide and thiocyanide Complexes--excess cyanide or thiocyanide anion added to:



C. Hydroxide Complexes--a concentrated/excess strong base added to:

