COORDINATION CHEMISTRY - INTRODUCTION

Much of reactivity can be understood in Lewis acidity terms. Perhaps the simplest examples of reactions are the formation of Lewis acid-base complexes. In a Lewis acid-base complex, a Lewis base has simply shared a pair of electrons with a Lewis acid, forming a new bond.

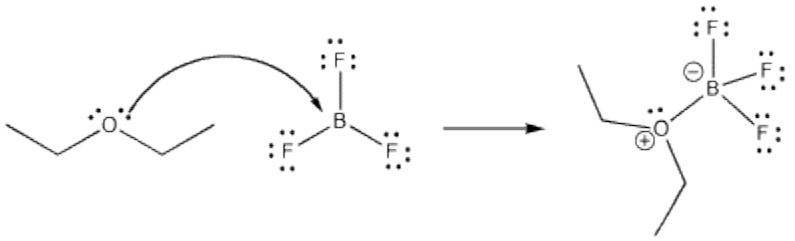

Figure CC1.1. Formation of a Lewis acid-base complex, boron trifluoride etherate.

Frequently, metal atoms or ions act as Lewis acids. They can often accept electrons from a number of different Lewis bases at once, forming "complexes" or "complex ions" ("complex" meaning they are formed from individual parts that connect together). These Lewis bases (also called "ligands") are said to be "coordinated" to the metal, meaning they are stuck to the metal via the electron pair that they share with it.

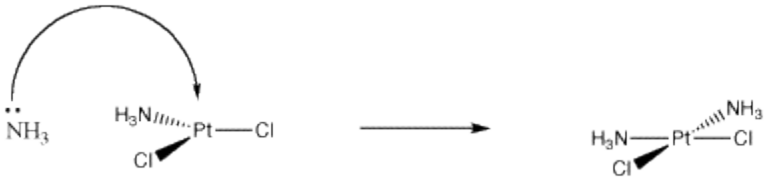

Figure CC1.2. Coordination of ammonia to complete the formation of *cis*-platin, an important antitumour drug.

"Coordination complexes" play important roles in biology as well as economically important processes. Probably the most familiar coordination complex in biology is hemoglobin. It can coordinate with an additional dioxygen molecule and carry the oxygen through the bloodstream, delivering oxygen to tissues much more efficiently.

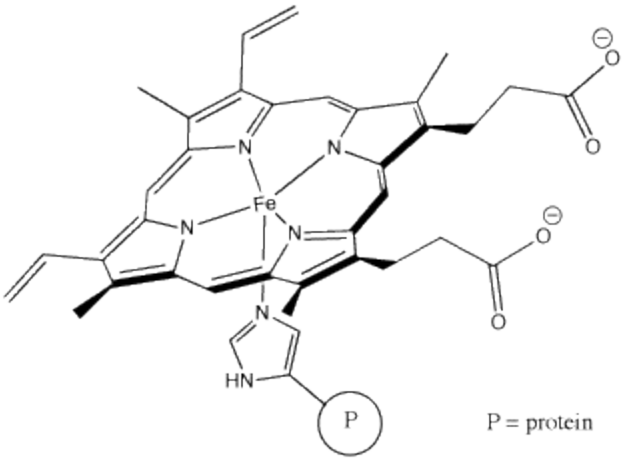

Figure CC1.3. Hemoglobin, a biologically important coordination complex.

A very common coordination complex in industrial use is Wilkinson's catalyst, $(PPh_3)_3RhCl$. Wilkinson's catalyst is used to make a number of transformations more efficient; most notably, it is used in hydrogenation reactions. Chemical transformations of this sort are commonly used in making pharmaceuticals and other high-demand materials.

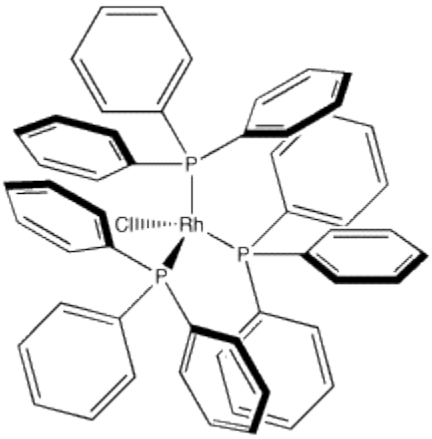

Figure CC1.4. Wilkinson's Catalyst.

Because coordination compounds can sometimes be anions or cations, there is a convention used to tell the reader which part of the formula is connected together, and which part is the counterion(s). The part listed in square brackets consists of ligands bonding to a central metal; the part outside the brackets is the counterion(s). For example, $[(H_2O)_6Co]Cl_2$ consists of a Co2+ ion bound to six waters. Two separate chloride anions are found nearby.

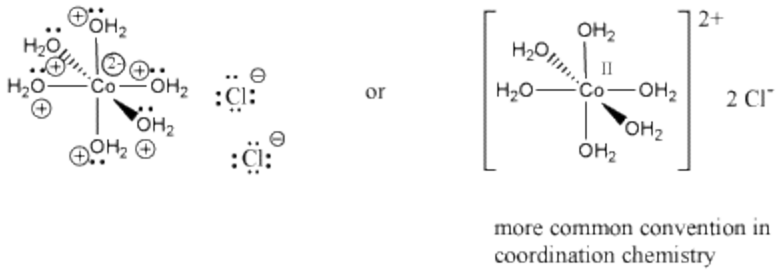

Figure CC1.3. Structural drawings for the formula $[(H_2O)_6Co]Cl_2$.

Source : http://employees.csbsju.edu/cschaller/Reactivity/coordchem/coordchem%20electron.htm