WERNER'S THEORY OF COORDINATION COMPOUNDS

Alfred Werner, a Swiss chemist born in 1866 and passing away in 1919, is credited as the pioneer in formulating theories regarding the structures of coordination compounds. His groundbreaking work involved the synthesis of a sequence of complexes through the amalgamation of cobalt chloride ($CoCl_2$) with ammonia (NH_3), which became known as Werner's series.

By subjecting these complexes to an excess of silver nitrate solution under cold conditions, a fascinating array of compounds emerged. Some of the chloride ions presents were able to form a precipitate as silver chloride (AgCl), while others remained dissolved within the solution, showcasing a nuanced interplay of chemical interactions.

In elucidating these characteristics, Werner proposed the following principles:

1. Each metal ion exhibits two distinct types of valencies: a. Primary valency, also known as principle or ionizable valency. b. Secondary valency, referred to as subsidiary or non-ionizable valency.
2. Primary valency typically involves ionization and is fulfilled exclusively by anions.
3. Secondary valency, on the other hand, remains non-ionizable and is satisfied either by ions or neutral electron-pair donor molecules, commonly known as ligands. This valency determines the coordination number of the central metal atom or ion.
4. Primary valencies lack directionality, while secondary valencies exhibit directionality.