

ABSTRACT

Although the complex reaction between cobalt and the nitroso naphthols have been known for almost 100 years, until now, no serious comprehensive studies of the reaction have been attempted. There have been scattered though lively disputes regarding the stoichiometry of the reaction and the nature of the complex formed, but other areas have been completely ignored.

In the present investigation the stage is set with a review of the chemistry of the nitroso naphthols. Then beginning with the ligands (1 nitroso 2-naphthols) an attempt has been made to detail as clearly and completely as possible those properties mostly involved in their reaction with cobalt, namely, stability, structure (spectral studies) and reducibility. Measurements of acid dissociation constants were also needed for kinetic studies.

The preparation, isolation and purification of the complex is then attempted with an extensive examination of its properties (molecular weight, stability, spectral, reducibility, chemical reactions) in an attempt to clarify its structure. Some side products of the reaction are also examined to determine the reaction pathway.

A very extensive study of the stoichiometry of the reaction involving the role of several factors (e.g. oxygen, pH and concentration) is then made and a theoretical interpretation of the results has been attempted. The properties of the complex and its method of formation then suggest a new analytical method for CoIII which is described.

An attempt is then made to determine the equilibrium steps in the reaction and to measure the values for the equilibrium constants. Finally, a comprehensive investigation of the kinetics of the CoII- and CoIII-nitroso reaction is carried out and a mechanistic interpretation of the results proposed. The values for the various rate constants have been also evaluated.