

Different Colored Complexes with Different Number of Ligands

Purpose

To demonstrate that the number of ligands (the same ligands) can alter the color of coordination complexes.

Materials

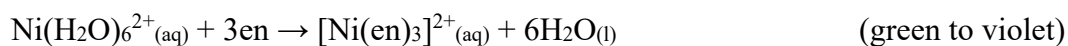
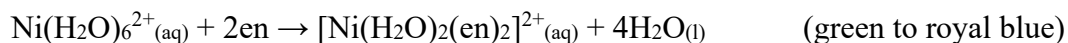
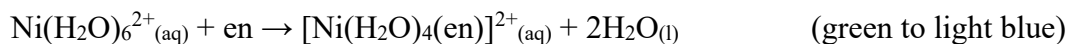
1M NiCl ₂	Four 400 ml beakers
Ethylenediamine (99%)	Stirring Rods

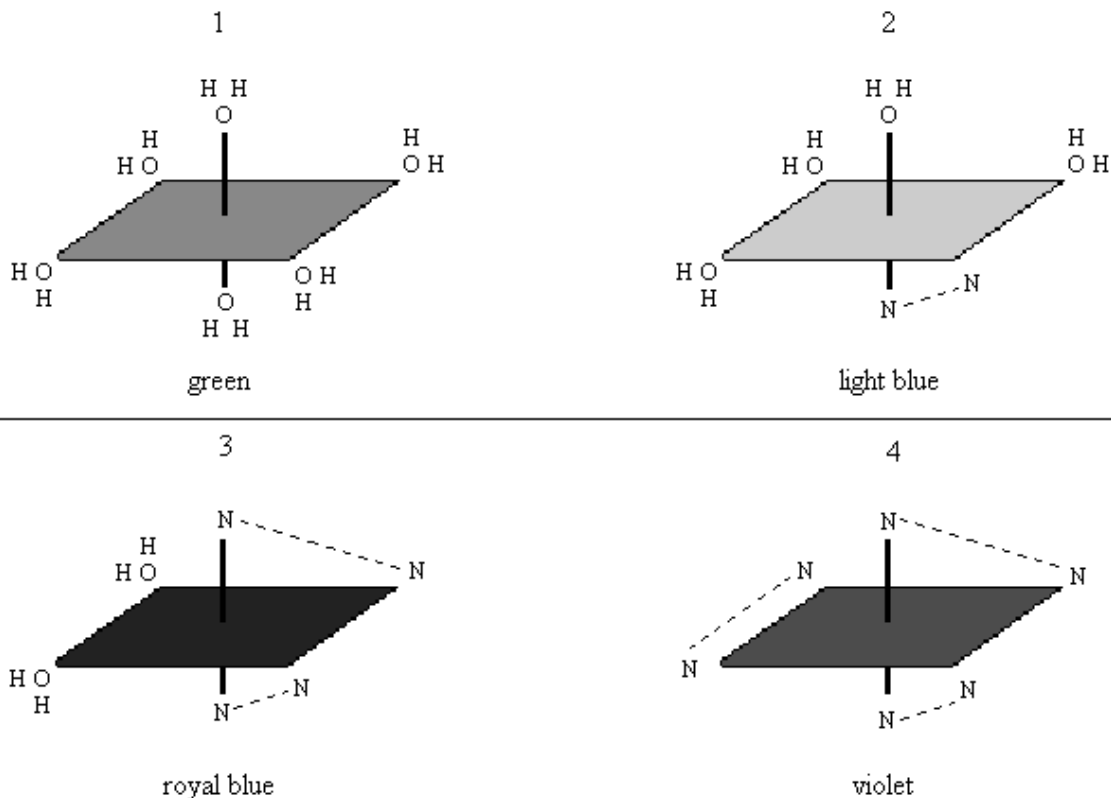
Procedure

1. Add 20mL of 1M NiCl₂ to Beaker 1, Beaker 2, Beaker 3, and Beaker 4.
2. Dilute each beaker with 280mL distilled water to yield a 300mL solution.
3. Beaker 2:
add ~1.0 mL of ethylenediamine. Stir the mixture to view a light blue color. If still green, add drops of ethylenediamine until light blue color appears.
4. Beaker 3:
add ~2.5 mL of ethylenediamine. Stir the mixture and a royal blue color should appear. If still green, add drops of ethylenediamine as done for beaker 2.
5. Beaker 4:
add ~4mL of ethylenediamine. Stir the mixture and a violet color should appear. If not, keep adding ethylenediamine as done for beaker 2 and 3.

Additional Information

1. The reactions are:





Safety

Ethylenediamine is a corrosive, toxic, flammable liquid. Inhalation may be fatal as a result of spasm, inflammation, and swelling of air passages. Can cause damage to kidneys, liver and stomach pains, vomiting, and diarrhea. Wear safety goggles and disposable gloves. If you prepare the chemicals for this demo, **WORK IN THE HOOD** when pouring ethylenediamine into 10 mL beaker.

Disposal

1. All of the waste from this experiment should go into the properly labeled waste containers with UI# 100944.
2. Rinse all glassware with acetone first, then wash with regular soap and water.

Reference

L.R. Summerlin, C.L. Borgford, and J.B. Ealy, 1987, *Chemical Demonstrations: A Source Book for Teachers*, vol. 2, pp 73-74.