Inorganic Chemistry Experiment:
Formation and Properties of Cu Coordination Complexes

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Hi, my name is Allyson Imfeld, and I am a senior majoring in Biochemistry at Purdue University. Today I'll be presenting an inorganic chemistry lab which aims to teach students about transition metal chemistry and formation of coordination complexes. This is done by performing a series of color changing reactions which demonstrate the characteristics of different copper (II) ligand complexes.

The objective of this laboratory experiment is to observe differences in multiple copper complexes and understand the transition metal chemistry behind how they are formed.

This lab is a part of a series of labs designed to examine the formation of different metal ion complexes. This particular lab focuses on the formation of copper (II) complexes. The experimental procedures are set up so that each step results in a ligand displacement and a resulting change in solution color. The hope is that by structuring the lab in this way will make it easier for students to examine differences in the metal complexes and understand the reactions taking place to form them. The image presented shows the expected changes in appearance for each of the displacement reactions, where the table below that shows the reaction equations and reports the color change that is seen.

Metal complexes are formed by a central metal ion and a set of surrounding ligands. Metals can form coordination complexes with a variety of ligands, which leads to a variety of properties such as color, reactivity, solubility and chemical structure. Because of their diversity, metal complexes find many applications in both nature and industry. Chlorophyllin, for example, is a Cu (II) metal complex that is used as a food coloring agent as well as for suppressing the effects of carcinogens in the body. There are many factors that influence the unique and varied properties of coordination complexes. Coordination complexes can form many different structural geometries based on how many ligands are bound to the metal ion and how they are bound to the metal. The strength of the metal-ligand bond affects how readily a ligand will exchange and the stability of the metal complex.

The diverse applications of metal complexes makes them a very important concept to understand. This lab plans to educate students about the formation and properties of copper complexes by studying a series of diverse ligand displacing reactions.

This concludes my poster presentation, thank you so much for listening.