Work in groups on these problems. You should try to answer the questions without referring to your textbook. If you get stuck, try asking another group for help.

Skills to Develop

• Use the descriptive chemistry of transition metals, largely correlated with d-electron configuration, to visualize the behavior of a complex, for example labile/inert, oxidizing/reducing and innersphere/outersphere.
• Given the reactants, be able to predict products based on the chemical behavior of the reactants and products.
• Ability to apply descriptive knowledge of TM complexes.
• Correctness of predicted products.

The presence of multiple oxidation states, redox reactions and ligand substitution reactions are dominant in the chemistry of transition metal complexes. This chemistry is important in the synthesis, application and biochemistry of transition metals.

Resources

• Reactions included in this handout.
• Rodgers on Electron Transfer Reactions, pp. 111 - 115.

Assignments

Pre-activity: Rodgers problems 5.46 and 5.47

Post-activity: Rodgers 5.53 and 5.54

Plan

1. Form groups of two. Arrive at a consensus on the analysis of the reactants’ chemistry and the prediction of the products.

Predict the products of the following reactions:

\[ \text{[Co(NH}_3\text{)}_5\text{Cl}^2+ + [Cr(H}_2\text{O)}_6\text{]^2+} \]
\[ \text{[Co(NH_3)_6]^{3+} + [Fe(bipy)_3]^{2+}} \]

\[ \text{[Cr(H_2O)_6]^{2+} + [IrCl_6]^{2-}} \]

Reference

- Susan Jackels, Seattle University