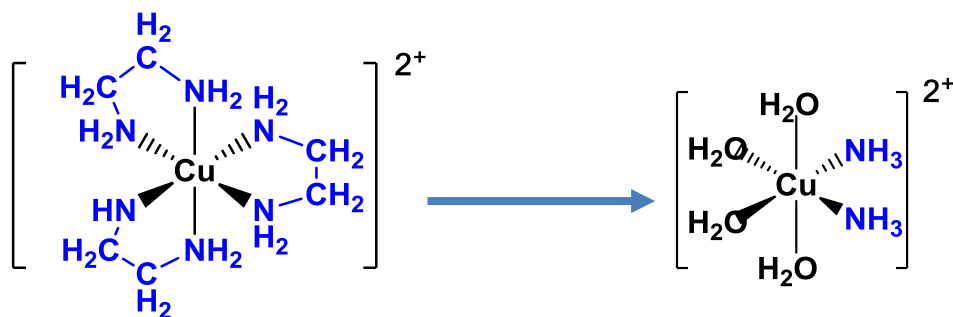


## G6-Transition Metals: Questions (Extended) - Answers

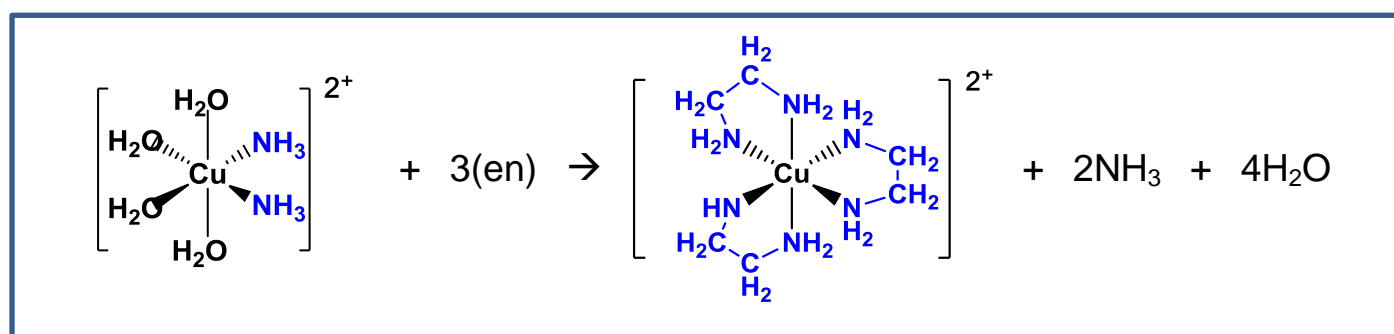
1. Explain why the reaction below is unlikely to occur, using all correct scientific terms.



Forbidden by entropy as the reaction would go from 7 moles to 4

No reason relating to enthalpy

2. Re-write the above equation so it is feasible. Include any reagents needed and by-products.



3. Look up the following refcodes in the WebCSD: **IDULOK** **LEBRUF**

One of the compounds has two enantiomers and one does not.

- a) Define the term *enantiomer*.

Two compounds which form non-superimposable mirror images of each other. Just like hands

- b) Give the refcode of the compound which has enantiomers and if you can, also write the formula of the compound.

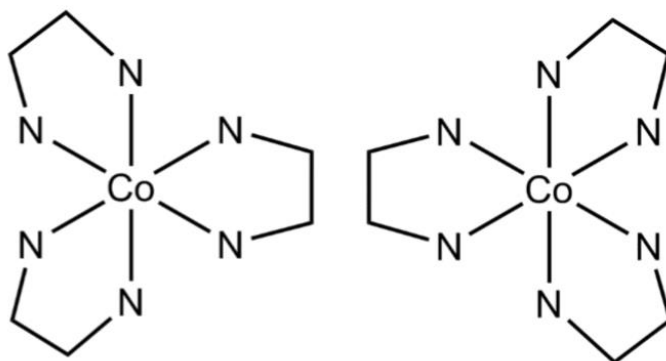
Name: **IDULOK**

Formula: **[Co(en)<sub>3</sub>]** or **[Co(H<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>)<sub>3</sub>]**

Must have square brackets around the entirety of the complex

## G6-Transition Metals: Questions (Extended) - Answers

- c) Draw both enantiomers of your chosen compound giving reasons as to why it is enantiomeric.

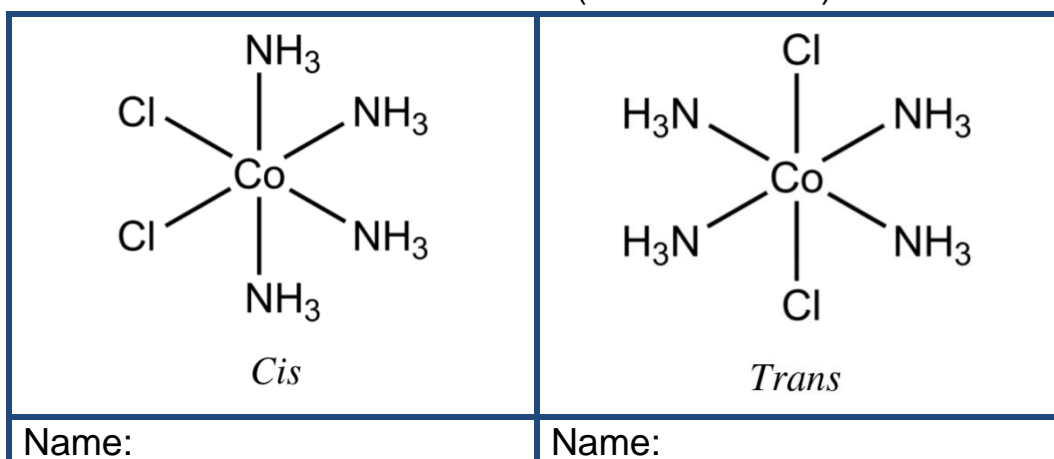


4. Explain the following order of stability in terms of Inorganic ligands:

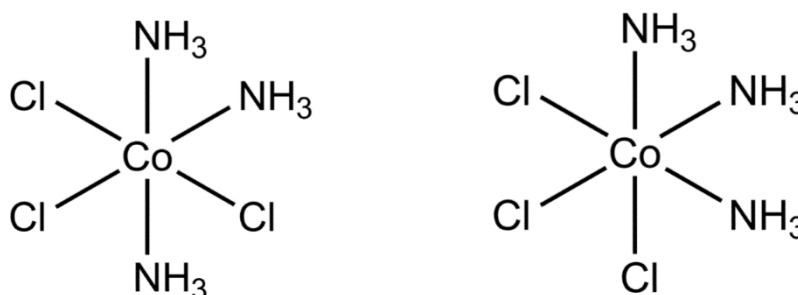
**Multidentate > Bidentate > Unidentate**

It is entropically unfavourable to have Unidentate ligands instead of multidentate

5. Draw and name both isomers of the complex  $[\text{Co}(\text{H}_2\text{O})_4\text{Cl}_2]$ . One of these complexes can be seen in the WebCSD (Ref: **BEVVAB**)



6. Two geometric isomers of the complex  $[\text{Co}(\text{H}_2\text{O})_3\text{Cl}_3]$  are shown below. Use these images to explain the difference between a *mer* and a *fac* isomer.



Fac isomers – are on a specific face of the octahedron

Mer isomers – are in the meridian of the octahedron