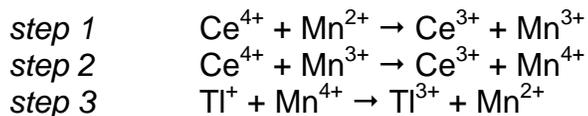


Another common component of reaction mechanisms is a **catalyst**. These are compounds that change the reaction mechanism and provide a pathway with a lower activation energy, and correspondingly faster reaction rate. They are a **reactant** in an early step in the mechanism and a **product** in a later step. They do not appear in the overall reaction, but do appear in the rate law.

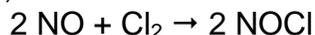
3. A reaction occurs by the following mechanism.



- a. Write the overall reaction
- b. Identify each of the components as a reactant, product, intermediate or catalyst:

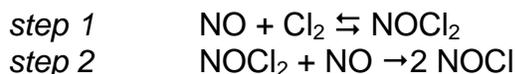


- c. Assuming that the catalyst is involved in the rate determining step, what is the rate law for this reaction?
- d. Why is the **uncatalyzed** reaction so slow? (Hint: look at the molecularity)
4. Under certain conditions, the reaction:



is found to be second order in NO and first order in Cl₂.

Given the following mechanism,



what are the relative rates of the two elementary steps under these conditions?

5. The rate of the reaction shown below was studied:
 $2 \text{NO} + \text{H}_2 \rightarrow \text{N}_2\text{O} + \text{H}_2\text{O}$
 It was found that the rate doubled when the $[\text{H}_2]$ was doubled. It was also found that the rate increased by a factor of four when the NO concentration was doubled. Which of the following mechanisms is/are consistent with these data?

