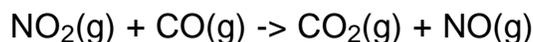
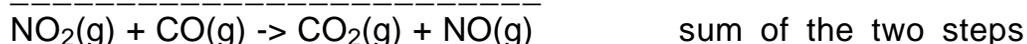
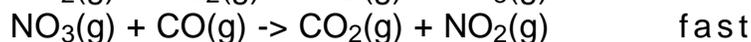
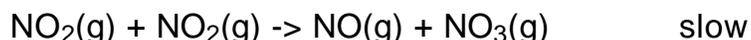


Chem12 Reaction Mechanisms 1-30

Many chemical reactions require more than one step. The following is an example of a two step reaction.

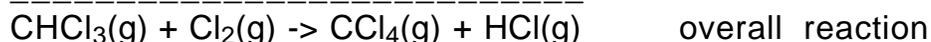
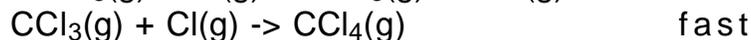
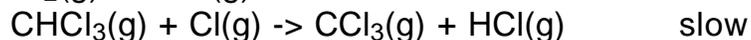


This reaction has at least two steps :



$\text{NO}_3(\text{g})$ is called a **reaction intermediate**. It is canceled on both sides. Reaction intermediates are short-lived species formed during collisions that are found at the "valleys" of a potential energy diagram.

Here is an example of a three step reaction between chloroform gas (CHCl_3) and chlorine gas.



Exercise : 1) The following steps for a two step reaction are given.

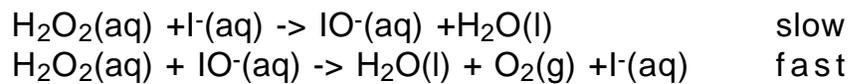


- Draw the potential energy diagram for this exothermic reaction.
- Give the overall reaction.
- Which step is the rate determining step?

Exercise : 2) Find the overall equation, given the two steps below.

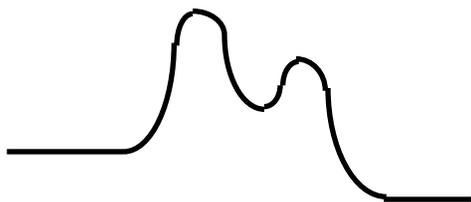


Exercise : 3) The following steps for a two step reaction are given.



- i) Give the overall reaction.
- ii) Which species is the catalyst ?
- iii) Name the reaction intermediate(s).

Answers : 1)i)



1)ii) $2\text{A} + \text{B} \rightarrow \text{X} + \text{Z}$, 1)iii) first step, 2) $\text{H}_2 + 2\text{ICl} \rightarrow \text{I}_2 + 2\text{HCl}$, 3)i) $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$, ii) $\text{I}^-(\text{aq})$, iii) $\text{IO}^-(\text{aq})$.