

Ex1. Describe how does the enthalpy of reaction remain unchanged when a catalyst is used in the reaction?

Solution: A catalyst is a substance which increases the speed of a reaction without itself undergoing any chemical change.

According to "intermediate complex formation theory" reactants first combine with the catalyst to form an intermediate complex which is short-lived and decomposes to form the products and regenerating the catalyst.

The intermediate formed has much lower potential energy than the intermediate complex formed between the reactants in the absence of the catalyst.

Thus, the presence of catalyst lower the potential energy barrier and the reaction follows a new alternate pathway which require less activation energy. We know that, the lower the activation energy, the faster is the reaction because more reactant molecules can cross the energy barrier and change into products.

Enthalpy, ΔH is a state function. Enthalpy of reaction, i.e., difference in energy between reactants and product is constant, which is clear from potential energy diagram.

Potential energy diagram of catalysed reaction is given as

