

Lecture no - 03

Paper - Eth

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(Physical Chemistry)

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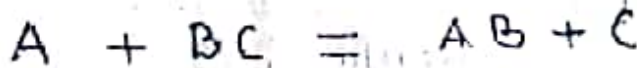
ACTIVATION ENERGY

It may be defined as "The amount of energy required by the reactant molecules to form an activated complex or transitional state is known as activation energy."

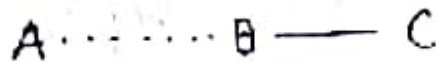
only the reactant molecules passing energy equal to or greater than this critical value would be able to get transformed into the products. It means that a certain amount of energy barrier exist between the reactants and products and the magnitude of activation energy determines the rate of the reaction. Fastest reaction are those requiring the lowest activation energy.

It is represented by 'E'.

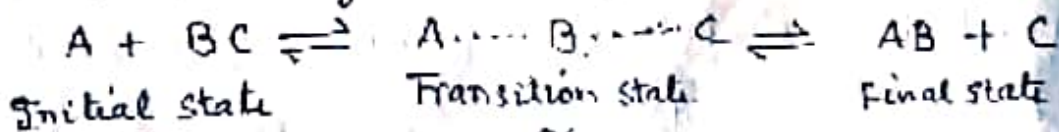
On considering the following reaction -



In which the atoms A being gradually brought of two diatomic molecule BC, the atoms are vibrating at normal distance apart. As long as the reactants are relatively far from each other, potential energy of a system is unaffected but as A approaches to BC more closely, the potential energy increases. This continues until a configuration is attained when it is just as possible



for A to unite with B forming AB + C or it is far B to remain with C. The activated complex or transition state through which the system A + BC must pass before



Initial state

Transition state

Final state

or
activated complex

The potential energy is maximum in the condition of transition state. The change of potential energy may be represented diagrammatically.

For an exothermic reaction, the energy level of the potential being ΔE below that of the reactant.

The energy difference between $A + B \rightarrow C$ and activated complex is equal to E and the activated complex is said for reverse reaction. The difference between

E_f and $E_b = \Delta E$ (The total energy change in this reaction)

