

Product of vector (multiplication of vector)

Scalar product

There are at least two ways to multiply vectors

1. Scalar dot product of two vectors: The scalar product is defined by the equation:

$$\vec{A} \cdot \vec{B} = AB \cos \theta$$

Where θ is the angle between \vec{A} and \vec{B} .

To see this consider the product between two vectors \vec{A} and \vec{B} .

Since the angle between \vec{A} and \vec{B} is θ , we can write the vectors in cartesian coordinates as:

Scalar product in terms of components:

$$\vec{A} = a_1\vec{i} + a_2\vec{j} + a_3\vec{k}$$

$$\vec{B} = b_1\vec{i} + b_2\vec{j} + b_3\vec{k}$$

Vector product

2. Vector cross product of two vectors: The vector product is defined by the equation,

$$\vec{A} \times \vec{B} = |\vec{A}| |\vec{B}| \sin \theta \vec{C}$$

Where \vec{C} is a unit vector perpendicular to the plane formed by \vec{A} and \vec{B} . To obtain

The direction of $\vec{A} \times \vec{B}$ the "the right hand rule" can be used.

The vector product in terms of components:

$$\vec{A} = \{a_1\vec{i} + a_2\vec{j} + a_3\vec{k}\}, \vec{B} = \{b_1\vec{i} + b_2\vec{j} + b_3\vec{k}\}$$

$$\vec{A} \times \vec{B} = \{a_1\vec{j} + a_2\vec{j} + a_3\vec{k}\} \times \{b_1\vec{i} + b_2\vec{j} + b_3\vec{k}\}$$

$$\vec{A} \times \vec{B} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix}$$

ENDOTHERMIC REACTION

- > Endothermic reaction occurs , if **sample absorbs some amount of heat** during phase transition
- > In Endothermic reaction more energy is needed to maintain zero temperature difference between sample and reference .
- > Endothermic reaction is shown by a **upward peak**

melting, boiling, sublimation, vaporization.



- It is a concerted reaction involving both alkyl halide and base.

$$\text{Rate} = [\text{alkyl halide}] [\text{base}]$$

That is why this reaction is called E2 (elimination bimolecular) reaction.

- E2 reaction is a concerted, one-step reaction, the proton and the bromide ion are removed in the same step i.e. in the rate determining step.

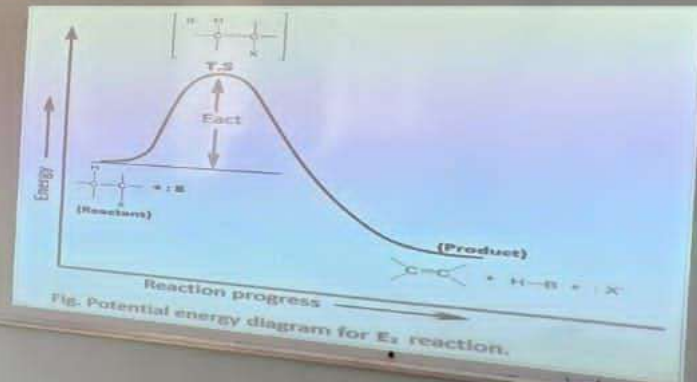
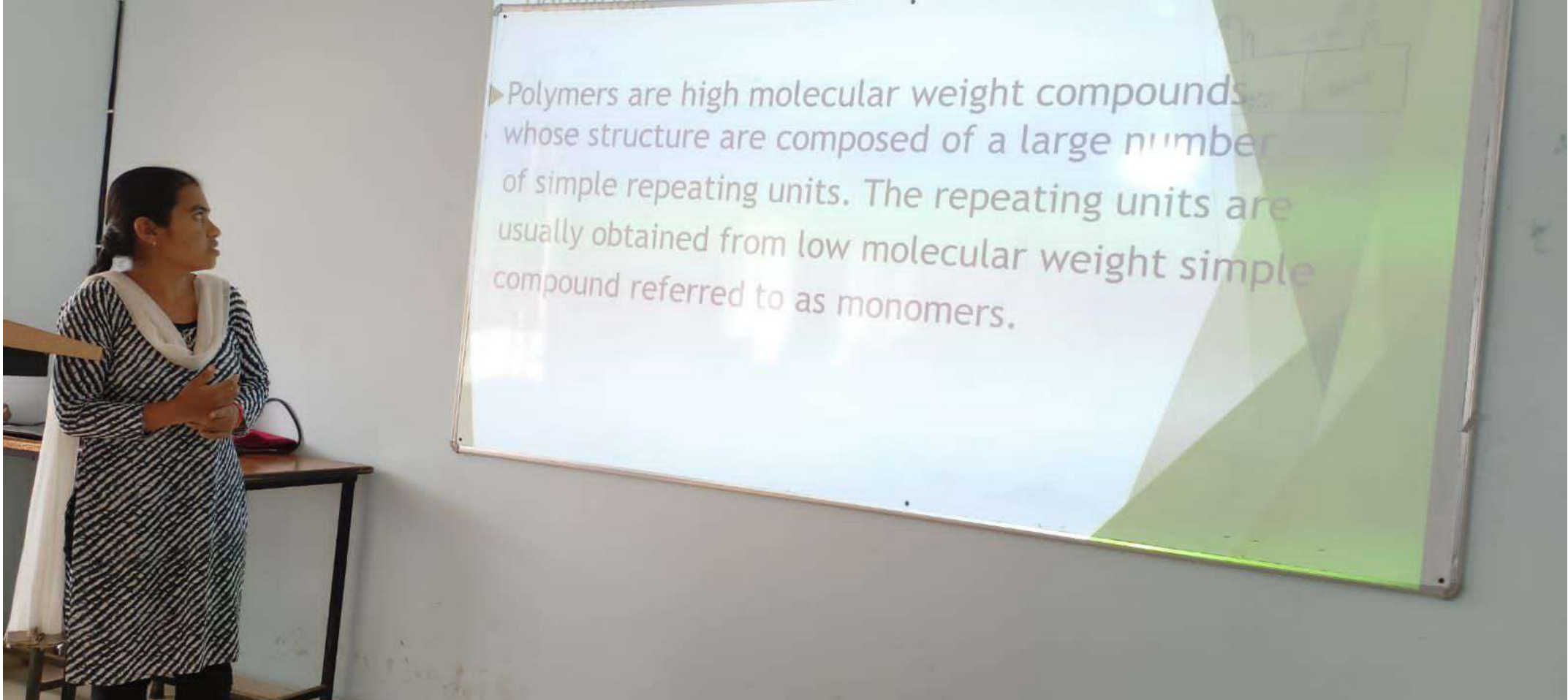


Fig. Potential energy diagram for E₂ reaction.





► Polymers are high molecular weight compounds whose structure are composed of a large number of simple repeating units. The repeating units are usually obtained from low molecular weight simple compound referred to as monomers.

(Faint chemical structure diagram is visible in the background on the right side of the whiteboard.)

Working Process

