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Electronics

## Chemistry Assignment

- Q) At  $378.5^{\circ}\text{C}$ , the half life period for the first order thermal decomposition of ethylene oxide is 363 min and the energy of activation of the reaction is 52,000 cal/mole. From these data estimate the time required for ethylene oxide to be 75% decomposed at  $450^{\circ}\text{C}$ .

Let  $K_1$  be rate constant at  $378.5^{\circ}\text{C}$ .

$$\therefore 363 = \frac{0.693}{K_1}$$

$$\therefore K_1 = 1.91 \times 10^{-3} \text{ min}^{-1}$$

From Arrhenius equation

[ $K_2$ , rate constant at  $450^{\circ}\text{C}$ ]

$$\ln \frac{K_2}{K_1} = \frac{E}{R} \left[ \frac{T_2 - T_1}{T_1 T_2} \right]$$

$$T_1 = 378.5 + 273 = 651.5 \text{ K}$$

$$T_2 = 450 + 273 \text{ K} = 723 \text{ K}$$

$$\therefore \ln \frac{K_2}{1.91 \times 10^{-3}} = \frac{52,000}{1985} \times \frac{723 - 651.5}{651.5 \times 723}$$

$$\therefore \cancel{K_2 = 0.101} \quad K_2 = 0.101 \text{ min}^{-1}$$

$\therefore$  If at  $450^{\circ}\text{C}$ , 75% decomposes

$$\therefore \text{in 't' time } K = \frac{1}{t} \ln \frac{a}{a-x}$$

$$0.101 = \frac{1}{t} \ln \frac{a}{\frac{1}{2}a} = t = 13.7 \text{ mins}$$

$\therefore$  13.7 mins will be required for 75% decomposition at  $450^{\circ}\text{C}$ .





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The plant I planted is Lily flower plant. With large, showy blooms, lilies add striking elegance to the yard. Grown from bulbs, lilies are perennial flowers that return year after year and require minimal care, provided that they are planted in the right place. They tend to bloom from early summer to fall depending on the type.