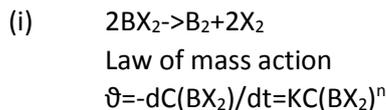


Answer on Question #60429 - Chemistry - Organic Chemistry



Simplify:
 $-\Delta\text{C}(\text{BX}_2) / \Delta t = \text{K} \cdot \text{C}(\text{BX}_2)^n$

For the first experiment and second, and third $\Delta\text{C}(\text{BX}_2)$ is equal because the amount of gas B_2 and X_2 also is equal.

As result law of mass action for the first experiment:

$$-\Delta\text{C}(\text{BX}_2) / 62 \text{ s} = \text{K} \cdot (0.07 \text{ mol l}^{-1})^n$$

For the second experiment

$$-\Delta\text{C}(\text{BX}_2) / 122 \text{ s} = \text{K} \cdot (0.05 \text{ mol l}^{-1})^n$$

For the third experiment:

$$-\Delta\text{C}(\text{BX}_2) / \Delta t_3 = \text{K} \cdot (0.05 \text{ mol l}^{-1})^n$$

Divide first equation on the second:

$$122 \text{ s} / 62 \text{ s} = (0.07 \text{ mol l}^{-1} / 0.05 \text{ mol l}^{-1})^n$$
$$n = 2.012$$

Divide first equation on the third:

$$\Delta t_3 / 62 \text{ s} = (0.07 \text{ mol l}^{-1} / 0.045 \text{ mol l}^{-1})^{2.012}$$
$$t_3 = 150.8 \text{ s} \approx 151 \text{ s}$$

Answer: 151 s.

(ii) Gibbs law:

$$\Delta G = \Delta H - T\Delta S$$

This process assumes serious growth of entropy. $\Delta S > 0$. This is logical because 3 mol of gases forms from 1 mol of BX_2 in solution. Chaos in system increases.

Growth of temperature lead to reduction of ΔG . ΔH changes slightly with growth of T, as result $-T\Delta S$ lead to the changing of ΔG .

$$\Delta G = -RT \ln K_c$$

ΔG decreases, as result K_c increases. It means that amount of products will be serious increased when the temperature will arise.

We don't know about E_{act} of this process, as result influence of temperature on the K in the law of mass action can not be considered.