

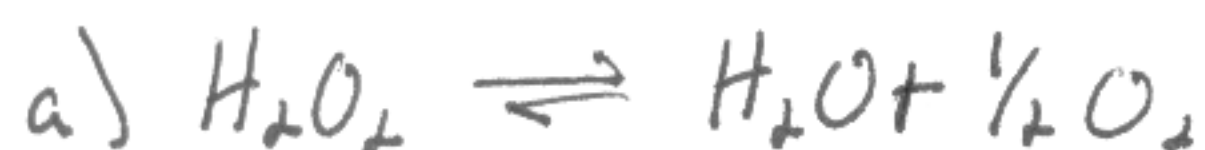
Quiz 6

Hydrogen peroxide (H_2O_2) decomposes in a first-order mechanism to form water and molecular oxygen.

a) Write the correctly balanced stoichiometric formula for the decomposition of hydrogen peroxide.

b) Write the rate equation for this decomposition.

c) A 0.20 mol L^{-1} solution of hydrogen peroxide decomposes with an initial rate of $1.7 \times 10^{-5} \text{ mol L}^{-1} \text{ s}^{-1}$. Determine the rate constant of the decomposition reaction.



$$b) v(t) = k[\text{H}_2\text{O}_2]$$

$$c) [\text{H}_2\text{O}_2] = 0.20 \text{ mol/L}$$

$$v(t) = 1.7 \times 10^{-5} \text{ mol/Ls}$$

$$k = \frac{v(t)}{[\text{H}_2\text{O}_2]} = \frac{(1.7 \times 10^{-5} \text{ mol/L/s})}{(0.20 \text{ mol/L})} = \boxed{8.5 \times 10^{-5} \text{ s}^{-1} = k}$$