Measuring Reaction Rates and Stoichiometry

Example One

Consider the decomposition of hydrogen iodide as shown below.

$$\mathbf{2\ HI\ (g)\ \rightarrow H_2\ (g) + I_2\ (g)}$$

Suppose that HI was decreasing at a rate of 12 M/s.
What is the rate at which H_2 and I_2 are produced?
What is the reaction rate?

Example Two

The chemical N_2O_5 decomposes according to the following equation:

$$\mathbf{2\ N_2O_5(g) \rightarrow 4\ NO_2(g) + O_2(g)}$$

If at a particular instant N_2O_5 is decomposing at a rate of 6.0×10^{-6} M/s, what is the rate of production of (a) NO_2, (b) O_2?

Example Three

Ethylene combusts according to the equation shown below

$$\mathbf{C_2H_4\ (g) + 3\ O_2\ (g) \rightarrow 2\ CO_2\ (g) + 2\ H_2O\ (g)}$$

If the concentration of C_2H_4 is decreasing at a rate of 0.036 M/s, what are the rates of change in concentrations of CO_2 and H_2O?