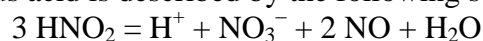


### Problem 1 Reaction rate

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The decomposition of nitrous acid is described by the following stoichiometric equation:



For the reaction rate in certain moment from the beginning of the reaction we have found the value  $J = 0.15 \text{ mol min}^{-1}$ . Calculate the rate of change of mole number of

(a)  $\text{HNO}_2$ , (b)  $\text{NO}$ , (c)  $\text{H}_2\text{O}$ .

[ (a)  $-0.45 \text{ mol min}^{-1}$ , (b)  $+0.30 \text{ mol min}^{-1}$ , (c)  $+0.15 \text{ mol min}^{-1}$  ]

#### Solution:



$$J = \frac{1}{\nu_i} \cdot \frac{dn_i}{d\tau} = 0.15 \text{ mol min}^{-1}$$

$$\frac{dn_i}{d\tau} = \nu_i \cdot J$$

$$\nu_{\text{HNO}_2} = -3$$

$$\frac{dn_{\text{HNO}_2}}{d\tau} = (-3) \cdot 0.15 = \underline{-0.45 \text{ mol min}^{-1}}$$

$$\nu_{\text{NO}} = +2$$

$$\frac{dn_{\text{NO}}}{d\tau} = (+2) \cdot 0.15 = \underline{+0.30 \text{ mol min}^{-1}}$$

$$\nu_{\text{H}_2\text{O}} = +1$$

$$\frac{dn_{\text{H}_2\text{O}}}{d\tau} = (+1) \cdot 0.15 = \underline{+0.15 \text{ mol min}^{-1}}$$