

Exam II only up to section 6.6

<http://rutchem.rutgers.edu/~esguerra/TEACH/chem161.html>

2002 Final, exercise 46

32g CH₄(g), P = 1.00 atm. Mass of CO₂(g) to increase total pressure to 1.50 atm? No CH₄ escapes.

$$P_T = P_{\text{CO}_2} + P_{\text{CH}_4} \quad P_{\text{CO}_2} = 1.50 \text{ atm} - 1.00 \text{ atm} = 0.50 \text{ atm}$$

$$P_{\text{CO}_2} = X_{\text{CO}_2} * P_T = \frac{n_{\text{CO}_2}}{n_{\text{CO}_2} + n_{\text{CH}_4}} * P_T$$

$$0.50 \text{ atm} = \frac{n_{\text{CO}_2}}{n_{\text{CO}_2} + n_{\text{CH}_4}} * 1.50 \text{ atm} ; n_{\text{CH}_4} = 32 \text{ g CH}_4 * \frac{1 \text{ mol CH}_4}{16 \text{ g CH}_4} = 2 \text{ mol CH}_4$$

$$\frac{0.50 \text{ atm}}{1.50 \text{ atm}} = \frac{n_{\text{CO}_2}}{n_{\text{CO}_2} + 2} ; \frac{1}{3} * (n_{\text{CO}_2} + 2) = n_{\text{CO}_2} \Rightarrow \frac{2}{3} = n_{\text{CO}_2} - \frac{1}{3} n_{\text{CO}_2}$$

$$\frac{2}{3} = n_{\text{CO}_2} \left(1 - \frac{1}{3}\right) ; \frac{2}{3} = n_{\text{CO}_2} * \frac{2}{3} ; n_{\text{CO}_2} = 1 \text{ mol CO}_2 * \frac{44 \text{ g CO}_2}{1 \text{ mol CO}_2} = \boxed{44 \text{ g CO}_2}$$

6.19) $K = \frac{1}{2} m v^2$

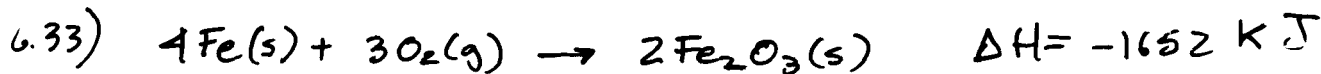
6.23) $\Delta E = q + w$ "1st law"

6.25) $w = -P \Delta V$ (only at constant P)

6.27) get W, $q_p = \Delta H = s * m * \Delta T$, $\Delta E = q_p + w = \Delta H + w$
"unit conversions"

6.29) $\Delta H = 180 \text{ KJ}$

- 6.31) a. colder.
b. burned gas.
c. H₂SO₄ dissolving gets hot.
d. water boiled.



- a. 4.00 mol Fe, excess O₂ → ? Q_p = ?
b. 1.00 mol Fe₂O₃ ; Q_p = ?
- a. $4 \text{ mol Fe} * \frac{-1652 \text{ KJ}}{4 \text{ mol Fe}} = -1652 \text{ KJ}$
b. $1 \text{ mol Fe}_2\text{O}_3 * \frac{-1652 \text{ KJ}}{2 \text{ mol Fe}_2\text{O}_3} = -826 \text{ KJ}$