7.4 The Law of corresponding states

- diff gases have the same equation of state if each gas is described by the dimensionless reduced variables $T_r = T/T_c$, $P_r = P/P_c$, and $V_{mr} = V_m/V_{mc}$, rather than by T, P, V_m. If 2 gases have same values T_r, P_r, V_{mr} they are in corresponding states
- van der waals equation written in the form:

$$P_r P_c = \frac{R T_r T_c}{V_{mr} V_{mc} - b} - \frac{a}{V_{mr}^2 V_{mc}^2}$$

$$\downarrow$$

$$\frac{a P_c}{27 b^2} = \frac{8 a T_r}{27 b (3 b V_{mr} - b)} - \frac{a}{9 b^2 V_{mr}^2} \quad \text{or}$$

$$P_r = \frac{8 T_r}{3 V_{mr} - 1} - \frac{3}{V_{mr}^2}$$

- using compression factor

$$\text{Error} = 100\% \cdot \frac{2-1}{2}$$

- $Z_c = \frac{P_c V_c}{R T_c} = \frac{1}{R} \times \frac{a}{27 b^2} \times 3b \times \frac{27 R b}{8 a} = \frac{3}{8}$

7.5 Fugacity and the Equilibrium Constant for Real Gases

- how does the pressure exerted by a real gas can be greater/less than that of an ideal gas affect the value of equilibrium constant for a mixture of reactive gases.