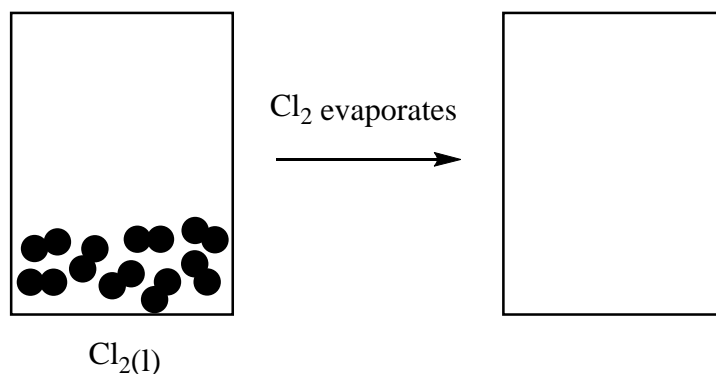


Exercise 9.3

Intermolecular Forces and Boiling Points

1.



- (a) Complete the diagram above. Label the contents of the right box (like the left box is labeled $\text{Cl}_2(l)$). Inside the right box, draw the system after the Cl_2 evaporates.
- (b) What is the main difference between the system before and after evaporation?

2. A substance's boiling point is the temperature at which enough of it evaporates that the pressure of evaporated substance is equal to the atmospheric pressure. At this temperature, gas bubbles can form within the liquid (rather than only having evaporation at the surface). As the temperature increases, the kinetic energy of particles in the system also increases. So, why do substances with stronger intermolecular forces have higher boiling points?

3. For each pair of compounds, identify the compound with the higher boiling point. Justify each answer.

(a) octane ($\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$) or hexane ($\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$)

(b) helium or argon

(c) SO_2 or CO_2