

# CHANGES OF STATE

Pg. 295 #7



① Ice @  $-20^{\circ}\text{C}$  to  $0^{\circ}$   $Q = mc\Delta T$

② Change of state Ice @  $0^{\circ}\text{C}$  to water @  $0^{\circ}\text{C}$   $Q = mL_f$

③ Water @  $0^{\circ}\text{C}$  to Water @  $100^{\circ}\text{C}$   $Q = mc\Delta T$

④ Change of state Water @  $100^{\circ}\text{C}$  to steam @  $100^{\circ}\text{C}$   $Q = mL_v$

⑤ Steam @  $100^{\circ}\text{C}$  to steam @  $110^{\circ}\text{C}$   $Q = mc\Delta T$

$$\textcircled{1} Q = (0.1\text{kg}) \left( 2108 \frac{\text{J}}{\text{kg}^{\circ}\text{C}} \right) (20^{\circ}\text{C}) \quad \textcircled{2} Q = mL_f$$

$$Q = 4216 \text{ J}$$

$$Q = 4220 \text{ J}$$

$$Q = (0.1\text{kg}) \left( 34 \times 10^5 \frac{\text{J}}{\text{kg}} \right)$$

$$Q = 34000 \text{ J}$$

$$\textcircled{3} Q = (0.1)(4180)(100)$$

$$Q = 41800 \text{ J}$$

$$\textcircled{4} Q = (0.1)(2.3 \times 10^6)$$

$$Q = 230000 \text{ J}$$

$$\textcircled{5}$$

$$Q = (0.1)(1991)(10)$$

$$Q = 1996 \text{ J}$$

$$Q = 2000 \text{ J}$$

$$Q_T = 310000 \text{ J}$$

Pg. 295 # 8

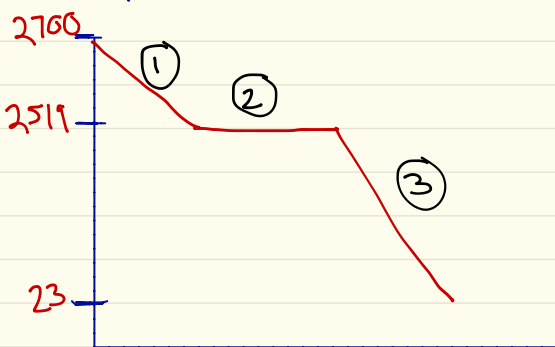
Aluminum  $2700^{\circ}\text{C} \rightarrow 23^{\circ}\text{C}$

mp.  $2519^{\circ}\text{C}$

↓  
melting point

$T > 2519^{\circ}\text{C}$  Al is a liquid

$T < 2519^{\circ}\text{C}$  Al is a solid



$$C_{\text{Al(solid)}} = 9.2 \times 10^2 \frac{\text{J}}{\text{kg}^{\circ}\text{C}}$$

$$C_{\text{Al(liquid)}} = 1180 \frac{\text{J}}{\text{kg}^{\circ}\text{C}}$$

① Al liquid at  $2700^{\circ}\text{C}$  to liquid at  $2519^{\circ}\text{C}$   
 $Q = mc\Delta T$

② Change of state liquid to solid  
Releasing energy  $Q = mL_f$

③ Al solid at  $2519^{\circ}\text{C} \rightarrow$  solid @  $23^{\circ}\text{C}$   
 $Q = mc\Delta T$

$$\begin{aligned}
 \textcircled{1} \quad Q &= mc \Delta T \\
 &= (1.5 \text{ kg}) \left( \frac{1180 \text{ J}}{\text{kg}^\circ\text{C}} \right) (2519 - 2700) \\
 &= (1.5)(1180)(-181) \\
 &= -320 \ 370 \text{ J}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{2} \quad Q &= mL_f \\
 Q &= \underset{\substack{\uparrow \\ \text{released}}}{-} (1.5 \text{ kg}) \left( 6.6 \times 10^5 \frac{\text{J}}{\text{kg}} \right) \\
 Q &= -990 \ 000 \text{ J}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{3} \quad Q &= mc \Delta T \\
 &= (1.5 \text{ kg}) \left( 9.2 \times 10^2 \frac{\text{J}}{\text{kg}^\circ\text{C}} \right) (23 - 2519) \\
 &= (1.5)(920)(-2496) \\
 Q &= -3 \ 444 \ 480 \text{ J}
 \end{aligned}$$

$$Q = -4 \ 754 \ 850 \text{ J}$$

Optional Questions for Quiz

Pg. 367 # 54-59

Quiz Tomorrow

Unit Test Wed. Nov. 30