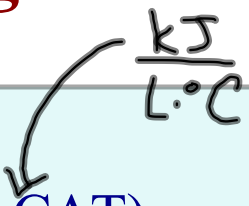
Energy Changes



- Heat ($q = mC\Delta T$ or $q = vC\Delta T$)
- Enthalpy changes ($\Delta H = nH$)
- Phase changes
- Total Energy changes
- Heating / Cooling curves
- Calorimetry
- Lab - Molar Enthalpy of Solutions

Calculate the amount of energy required to solidify 17.0 g of water at 0.0°C.

$$\Delta H_{solid} = n H_{solid}$$

$$\Delta H_{solid} = \left(\frac{17.0\,g}{18.02\,g/mol}\right)\left(-6.03\,\frac{kJ}{mol}\right)$$

$$= -\quad kJ$$

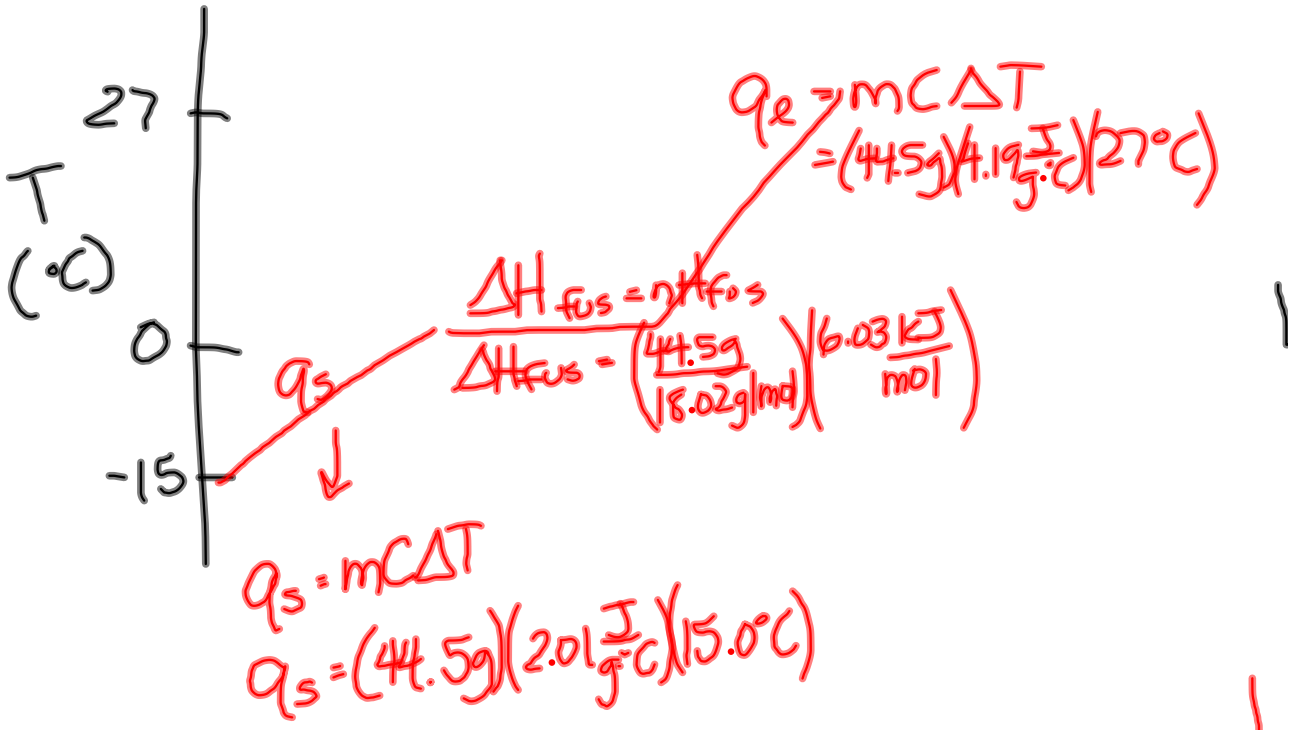
Calculate the amount of energy required to heat 29.0 g of aluminum from 24°C to 73°C.

$q = mC\Delta T$

$q = (29.0\,g)\left(0.900\,\frac{J}{g°C}\right)(49°C)$

$q = \quad J$

Calculate the amount of energy required to heat 44.5 g of ice at -15.0°C to water at 27°C.



20.0 g of KNO_3 is added to a calorimeter containing 100. mL of water. The temperature of the water increased from 21.6°C to 24.8°C. Calculate the molar enthalpy of solution.

$$\Delta H_s = -q$$

$$nH_s = -vC\Delta T$$

$$\left(\frac{20.0\,g}{118.11\,g/mol}\right) H_s = -\left(0.100\,L\right)\left(4.19\,\frac{kJ}{L\cdot°C}\right)\left(3.2°C\right)$$

Energy Changes Worksheet