

Vocabulary to know:

- Vaporization
- Fusion
- Exothermic
- Condensation
- Solidification
- Joule (in notes)
- Chemical Potential energy
- Endothermic
- Specific Heat Capacity
- Chemical Energy

$$C_{p(\text{liquid})} = 4.18 \text{ J/g}\cdot^{\circ}\text{C}$$

$$C_{p(\text{ice})} = 2.09 \text{ J/g}\cdot^{\circ}\text{C}$$

$$C_{p(\text{steam})} = 1.84 \text{ J/g}\cdot^{\circ}\text{C}$$

Things to study

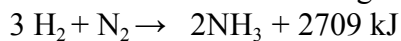
- Difference between endothermic and exothermic processes
- Chemical Energy Stoich
- Concepts of specific heat. What is the difference between a high specific heat and a low specific heat?
- Can you draw a heat curve? Label liquid, solid, and gas.
- Label fusion, solidification, vaporization, and condensation on the heat curve
- Know the concepts and relationship between heat and temperature on the heat curve
- How to calculate using $q = mc\Delta T$

Sample Questions - $q = mc\Delta T$

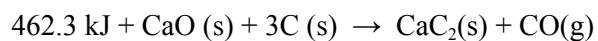
1. If a 134.5 g piece of metal requires 1.07 kJ to raise its temperature from 45 °C to 79 °C, what is the specific heat of the metal?
2. Find the *initial temperature* of 5.00 moles of water as it cools to a temperature of 20.0 °C if the amount of heat released is 20.0 kJ
3. If a sample of water at 70 °C cools to a temperature of 35 °C, and the energy change of the system is -40.0 kJ, what is the mass of the water?
4. How much heat is given out when 100.0 g of solid lead cools from 200.0 °C to 0.0 °C (the specific heat of lead is 0.128 J/g°C).

Sample Questions - Thermochemical Stoichiometry

5. What mass of hydrogen must be reacted with excess nitrogen to produce 5.00 kJ of energy?



6. Calcium oxide, CaO, reacts with carbon as graphite (pure carbon). Calcium carbide, CaC₂, and carbon monoxide are produced in an endothermic reaction.



- a. 246.7 kJ of energy is available to react. What mass of carbon monoxide (CO) is produced, assuming sufficient reactants?
- b. What is the heat change for the reaction of 96.7 g of graphite (carbon) with excess calcium oxide?