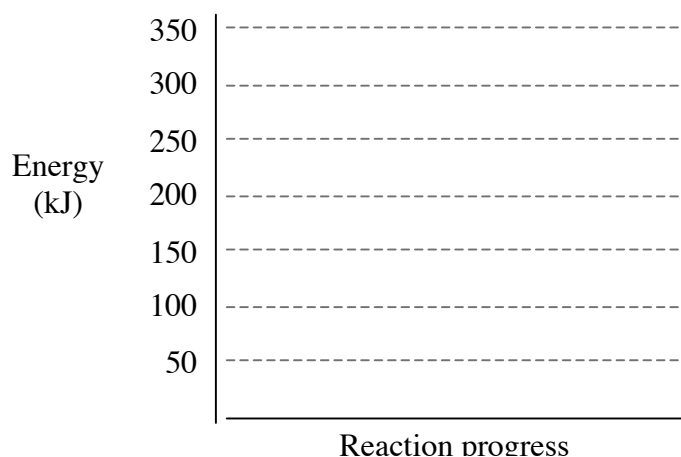


Energy and Thermochemistry Review

- Make the following conversions
 - 8500 cal into Food Calories
 - 1.8 kJ into joules
 - 47.85 cal into joules
 - .209 kJ into calories
 - 750 J into kJ
 - 358.9 cal into kJ
- Calculate the heat in kcal that is absorbed when 1.00 L of water is heated from 18.0°C to 85.0°C?
- A 195 g aluminum engine part at an initial temperature of 3.00°C absorbs 4.00 kcal of heat. What is the final temperature of the part? The specific heat capacity of Aluminum = 0.21 cal/g°C.
- What quantity of heat is needed to raise the temp of 500.0 g of Cu from 20.0°C to 50.0°C? The specific heat capacity of Copper = 24.5 J/mol°C (you must convert this to J/g°C)
- 40.0 g of solution has its temperature increased from 25°C to 50°C by addition of 4,067 J of heat. What is the specific heat in J/g°C for the solution? Compare this value to the specific heat of water.
- What is the final temperature of 150 g of water within a calorimeter if the water is at 20.0°C before 28 g of candle wax are burned releasing 600 calories of energy.
- Calculate the heat that must be removed for 63 g H₂O to freeze at 0.0°C
- Calculate the heat needed for 7.92 g H₂O solid water at -10.0°C to become liquid at 33.0°C
- Calculate the heat given off when 10.0 g of 110°C steam is cooled to -20°C solid ice.
- $\text{MgCO}_3(\text{s}) \rightarrow \text{MgO}(\text{s}) + \text{CO}_2(\text{g}) \quad \Delta H_{\text{rxn}} = 117.3 \text{ kJ}$
 - Is heat absorbed or released in the rxn?
 - What is ΔH_{rxn} for the reverse reaction?
 - What is ΔH_{rxn} when 5.35 mol CO₂ reacts with excess MgO?
- When 1 mol KBr(s) decomposes to its elements, 394 kJ of heat is absorbed.
 - Write a balanced thermochemical equation for this reaction.
 - How much heat is released when 100.0 g KBr forms from its elements?

12. Explain how the low specific heat of a metal causes the metal to react when exposed to heat.
13. Explain how the high specific heat of water causes the water to react when exposed to heat.
14. Is condensation endothermic or exothermic? What is the opposite phase change of condensation?
15. Is melting endothermic or exothermic? What is the opposite phase change of melting?
16. What is a radioactive isotope?
17. What is an alpha particle and what is its symbol?
18. What is a beta particle and what is its symbol?
19. Explain the difference between nuclear fission and fusion.
20. Draw an energy diagram for a reaction in which the potential energy of the reactants is 50 kJ, the potential energy of the products is 150 kJ, and the activation energy of the forward reaction is 300 kJ.



21. Is this reaction endothermic or exothermic?
22. What is the enthalpy change for this reaction?
23. What is the activation energy for the reverse reaction?
24. Is the reverse reaction endothermic or exothermic?
25. What is the potential energy of the activated complex?
26. What effect would a catalyst have on the activation energy?
27. What effect would a catalyst have on the enthalpy change for the reaction?