N2 – Thermochemistry – A Review

|  |
| --- |
| Some Background Knowledge Definitions |
| *Not all the definitions from the notes – you still have to take notes!* |
| **Energy** – capacity to do work or produce heat |
| **Potential Energy** – due to position or composition |
| **Kinetic Energy** - due to motion |
| **Electrical Energy** – flow of electrical charge |
| **Thermal Energy** – molecular motion |
| **Light/Radiant Energy** – energy transitions in an atom |
| **Nuclear Energy** – potential energy in atomic nuclei |
| **Chemical Energy** – due to structure of atoms/bonds |
| **Law of Conservation of Energy** –  cannot create or destroy energy |
| **1st Law of Thermodynamics** –  total energy content of universe is constant |
| **State Function** –  depends only on present state, not pathway to get there |

|  |  |
| --- | --- |
| **Endothermic** | |
| System absorbs energy | Surroundings release energy |
| System energy increases | Surrounding energy decreases |
| + qsystem | – qsurroundings |
| If you touch the container YOU feel cold – the system is taking heat away from YOU! Your thermometer is in the SURROUNDINGS so the temperature it reads decreases! | |

|  |  |
| --- | --- |
| **Exothermic** | |
| System releases energy | Surroundings gain energy |
| System energy decreases | Surrounding energy increases |
| – qsystem | + qsurroundings |
| If you touch the container YOU feel hot – the system is releasing heat towards YOU! Your thermometer is in the SURROUNDINGS so the temperature it reads increases! | |

**Q#1** Identical amounts of heat are applied   
to 50 g blocks of lead, silver, and copper,   
all at an initial temp of 25°C. Which block   
will have the largest increase in temp?

**Q#2** Determine the energy required to convert 21.1 grams of ice at -6°C to steam at 100°C

**Q#3** A sample of barium chloride is increased in temperature by 3.8C when the sample absorbed 2.4 x 102J of heat energy. Calculate the number of mole sof barium chloride in the sample if its molar heat capacity is 75.1 J/mol•K

**Q#4** The temperature of a 700.0-g bar of iron decreases by 10.0°C when the iron is plunged into 500.0 g of water. What is the temperature increase of the water, assuming that no heat is lost in the transfer? (CFe = 0.45 J/g°C)

**Q#5** 50.0 g of water at 22 °C is mixed with 125 g of water initially at 36 ° C. What is the final temperature of the water after mixing, assuming no heat is lost to the surroundings?

N2 – Thermochemistry – A Review

|  |
| --- |
| Some Background Knowledge Definitions |
| *Not all the definitions from the notes – you still have to take notes!* |
| **Energy** – capacity to do work or produce heat |
| **Potential Energy** – due to position or composition |
| **Kinetic Energy** - due to motion |
| **Electrical Energy** – flow of electrical charge |
| **Thermal Energy** – molecular motion |
| **Light/Radiant Energy** – energy transitions in an atom |
| **Nuclear Energy** – potential energy in atomic nuclei |
| **Chemical Energy** – due to structure of atoms/bonds |
| **Law of Conservation of Energy** –  cannot create or destroy energy |
| **1st Law of Thermodynamics** –  total energy content of universe is constant |
| **State Function** –  depends only on present state, not pathway to get there |

|  |  |
| --- | --- |
| **Endothermic** | |
| System absorbs energy | Surroundings release energy |
| System energy increases | Surrounding energy decreases |
| + qsystem | – qsurroundings |
| If you touch the container YOU feel cold – the system is taking heat away from YOU! Your thermometer is in the SURROUNDINGS so the temperature it reads decreases! | |

|  |  |
| --- | --- |
| **Exothermic** | |
| System releases energy | Surroundings gain energy |
| System energy decreases | Surrounding energy increases |
| – qsystem | + qsurroundings |
| If you touch the container YOU feel hot – the system is releasing heat towards YOU! Your thermometer is in the SURROUNDINGS so the temperature it reads increases! | |

**Q#1** Identical amounts of heat are applied   
to 50 g blocks of lead, silver, and copper,   
all at an initial temp of 25°C. Which block   
will have the largest increase in temp?

**Q#2** Determine the energy required to convert 21.1 grams of ice at -6°C to steam at 100°C

**Q#3** A sample of barium chloride is increased in temperature by 3.8C when the sample absorbed 2.4 x 102J of heat energy. Calculate the number of mole sof barium chloride in the sample if its molar heat capacity is 75.1 J/mol•K

**Q#4** The temperature of a 700.0-g bar of iron decreases by 10.0°C when the iron is plunged into 500.0 g of water. What is the temperature increase of the water, assuming that no heat is lost in the transfer? (CFe = 0.45 J/g°C)

**Q#5** 50.0 g of water at 22 °C is mixed with 125 g of water initially at 36 ° C. What is the final temperature of the water after mixing, assuming no heat is lost to the surroundings?