

BOND ENERGY AND ENERGY IN CHEMICAL REACTIONS

Learning Outcomes

- I can explain the difference between heat and temperature.
- I can explain how heat affects chemical reactions.
- I can identify chemical reactions based on whether they absorb heat or give off heat.

Heat Transfer in Chemical Reactions

- One way of classifying _____ is whether they give off heat or absorb heat.

Question: _____

Temperature:

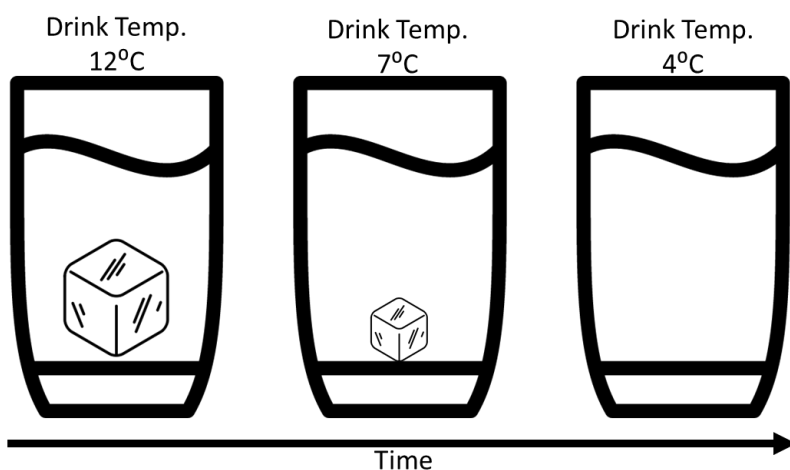
- Measured as the _____ of a substance.
- Kinetic Energy = KE = _____
- What is Kinetic Energy then?

State	Solid	Liquid	Gas
Diagram			
Arrangement of particles	Regular arrangement	Randomly arranged	Randomly arranged
Movement of particles	Vibrate about a fixed position	Move around each other	Move quickly in all directions
Closeness of particles	Very close	Close	Far apart

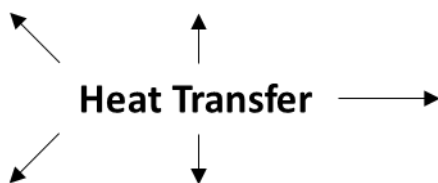
- _____ temperature → more _____ → _____ moving particles

Heat

- heat represents the _____ from one substance to another
- Heat ALWAYS flows in ONE DIRECTION: from a _____ substance to a _____ substance until they reach a common temperature (_____).



_____ (energy) is transferred from the _____ to the _____, which turns the solid ice into liquid water.



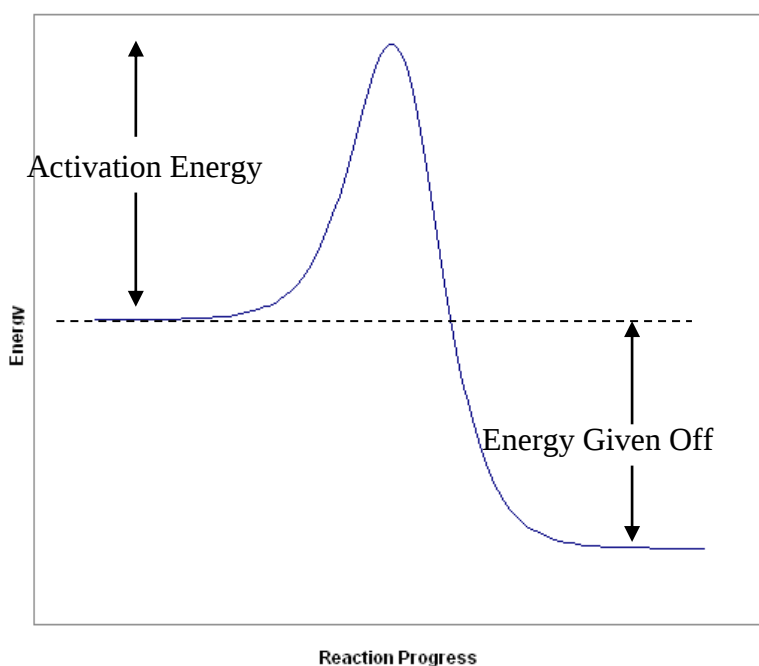
Classifying Reactions Based on Heat

- chemical reactions either _____ or _____ energy
- **Activation Energy:** the energy required to start a reaction in a chemical system
 - Make or break _____
 - measured in units of _____

We will consider two types of reactions: Exothermic and Endothermic

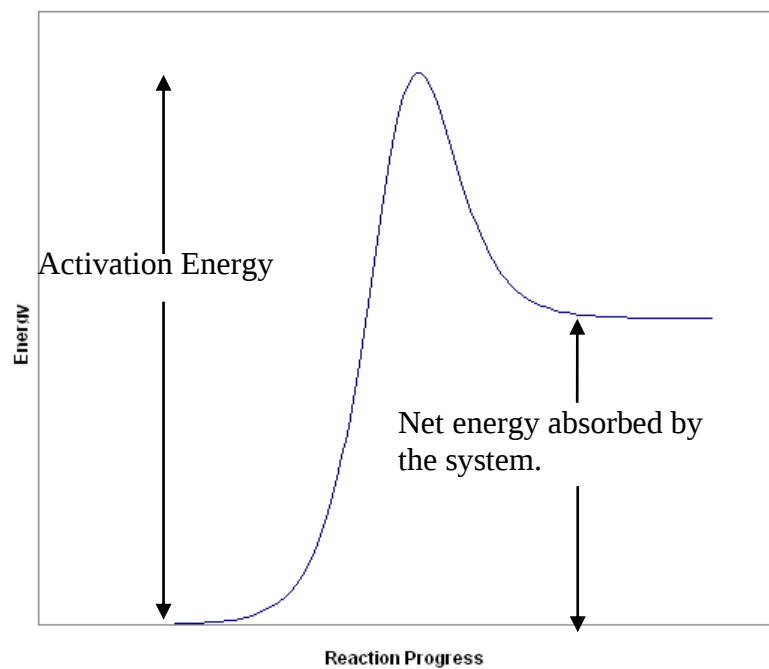
1. Exothermic Reaction

- net energy release occurs from the chemical system to the surroundings
- Energy is _____ when bonds are formed.
- energy released is often in the form of _____
- example: _____



2. Endothermic Reaction

- a reaction in which energy is _____ and stored in _____.
- the reaction feels cool or cold
- Activation energy is _____ than total energy released.
- example: _____



Examples of exothermic and endothermic reactions: