

Chapter 19: Chemical Reactions

Section 3: Chemical Reactions and Energy

All chemical reactions release or absorb energy.

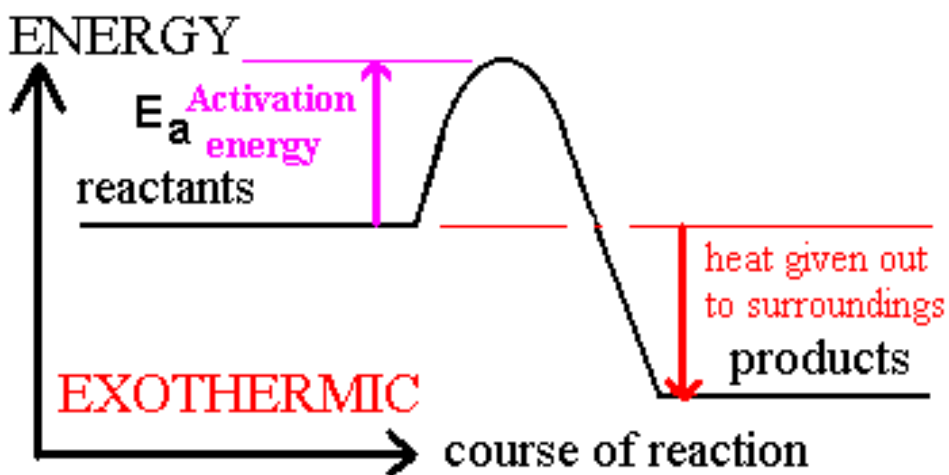
- This energy can take many forms such as thermal energy (heat), light, sound, or electricity.
- Chemical bonds are the source of this energy.
 - When a chemical reaction takes place, some chemical bonds are broken which requires energy called activation energy on the reactant side.
 - Bond formation on the product side releases energy.

Prefixes time:

- Endo- means inside or internal.
- Exo- means outside or external.

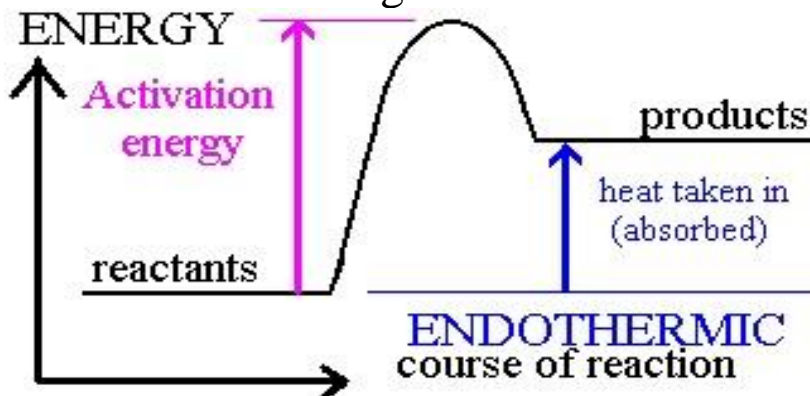
Exergonic reactions: chemical reactions that release energy.

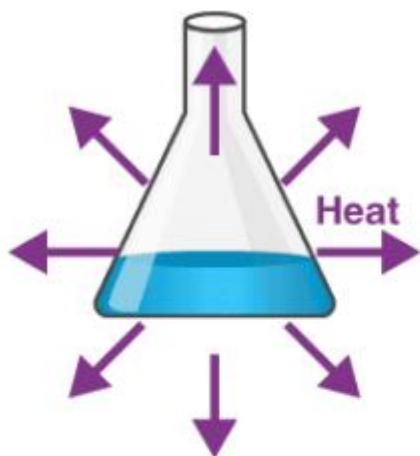
- The activation energy required to break the original bonds is less than the energy that is released when new bonds form
- Some form of energy, such as light or thermal energy, is given off by the reaction
 - Bugs that “glow” are examples of exergonic reactions
- **Exothermic reactions:** when the energy given off is primarily in the form of thermal energy
 - Heat is given off.
 - Fossil fuels burning providing heat for our homes is an example of an exothermic reaction.



Endergonic reactions: chemical reactions that require more energy to break bonds than is released when new ones are formed.

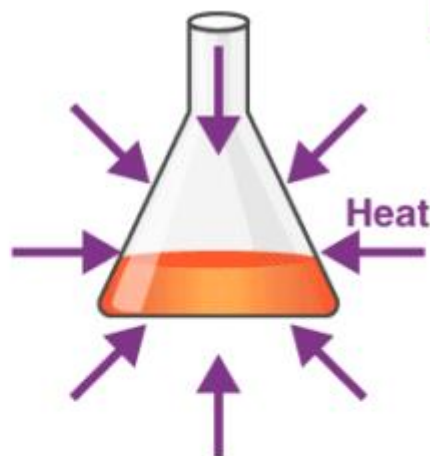
- Chemical reactions that absorb energy
- The energy absorbed can be in the form of light, thermal energy, or electricity with electricity being the most common form of energy supply to break bonds.
 - If you run an electrical current through water, you can break the bonds in the water to form hydrogen gas and oxygen gas.
- **Endothermic reaction:** when the energy needed to keep a reaction going is in the form of thermal energy
 - Heat is absorbed.
 - Think back to our reaction of baking soda and vinegar. The bag got cold meaning that heat was absorbed into the breaking of the bonds. Baking cookies is another example.





Exothermic Reactions

A reaction that releases energy from the system in the form of heat.



Endothermic Reaction

A reaction that the system absorbs energy from its surrounding in the form of heat.