

Exothermic and endothermic reactions

One way to classify chemical reactions depends on whether they release or absorb energy. Chemical reactions that release energy in the form of heat or light are referred to as **exothermic**. Exothermic reactions include flames, explosions and fireworks.

For example, octane (C_8H_{18}) in petrol explodes releasing energy as heat and a flash of light. The word equation for this reaction is:



and its balanced formula equation is:



The chemical reactions in glow sticks and glow-worms are also exothermic because they produce light. However, not all exothermic reactions are as impressive as these—some may just feel warm to the touch.

Chemical reactions that absorb energy are called **endothermic**. Endothermic reactions usually feel cold because they absorb the heat energy from your skin and the surroundings. Chemical ice packs use an endothermic reaction between ammonium chloride and water to make the pack icy cold without refrigeration. A chemical ice pack is shown in Figure 5.1.2.

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Figure 5.1.2

Sports people often use chemical ice packs to soothe injuries. When the endothermic chemical reaction starts, the pack suddenly cools.

Exothermic reactions

A really common thing that happens is a change in energy. When you sit near a wood fire you get warm from all the heat energy coming from the fire. This heat energy is given off as the wood combines with oxygen. Combining with oxygen is burning.

This is called an **exothermic reaction**. The meaning of the word will help you to remember.

- *Exo* means out, as in exit.
- *Thermo* means heat. So exothermic means *out heat*.

Endothermic reactions

Some reactions will only take place when energy is put in. A cake mixture will only change into a cake when lots of heat energy is given to the mixture.

The meaning of the word will help you again.

- *Endo* means into.
- *Thermo* means heat. So endothermic means in heat.

Chemical reactions that produce heat are called **EXOTHERMIC REACTIONS**.

Chemical reactions that take in energy and make things colder are called **ENDOTHERMIC REACTIONS**.