

# Differences Between Chemical Changes: Endothermic & Exothermic Reactions

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The difference between endothermic and exothermic reactions lies in the words themselves. "Thermic" refers to heat, just as in the word "thermometer." "Exo" means "outside" and "endo" means "inside." Thus, an endothermic reaction pulls heat into an object or area, while an exothermic reaction expels heat. From this basic definition of the terms, you can understand a variety of other facts about these two types of chemical reaction.

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## Endothermic Reactions Cool Their Surroundings

From a chemistry standpoint, there is no such thing as cold -- only an absence of heat. Endothermic reactions draw heat energy into themselves. As that heat leaves the surrounding area, the temperature drops. For example, a chemical first aid cold pack works because of an endothermic reaction between water and ammonium nitrate. Because it pulls heat energy into the pack, the pack feels cold to the touch as it draws heat from the surrounding area.

## Endothermic Reactions Contain More Energy

Endothermic reactions draw in and store energy in the form of chemical bonds produced by the reaction. In an endothermic reaction, the product contains more net energy than the reactants did at the start of the process. The products of the endothermic reactions usually have more volume because of the stored energy.

## Exothermic Reactions Make Surroundings Hotter

An exothermic reaction sheds heat energy as the reaction progresses, meaning it radiates heat while it is going on. In a campfire, the energy from the chemical bonds of the wood and paper is released in the form of heat and light. That released energy makes the surrounding area warmer for cold campers.

## Exothermic Reactions Contain Less Energy

In any exothermic reaction, energy is removed from the chemical bonds in the reactants. This usually requires an initial bit of energy called "activation energy" to get the process started, such as a lit match or other application of heat to start that campfire. After the exothermic process has finished, the product has lower heat and is generally more compact.

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