

Entropy:

[Science](#), [Chemistry](#)



Entropy: Entropy is a measure of the disorder of a system. Entropy comes from the second law of thermodynamics, which states that all systems tend to reach a state of equilibrium. The significance of entropy is that when a spontaneous change occurs in a system, it will always be found that if the total entropy change for everything involved is calculated, a positive value will be obtained. Simply, all spontaneous changes in an isolated chemical system occur with an increase in entropy. Like enthalpy, you can calculate the change of S (ΔS). Formula- $\Delta S = S(\text{products}) - S(\text{reactants})$ Example- Take a room as an example. Left to itself, a room will increase in entropy (i.e., get messier) if no work (cleaning up) is done to contain the disorder. Work must be done to keep the entropy of the system low. Spontaneous chemical reaction: A reaction is said to be spontaneous if it occurs without being driven by some outside force. There are two driving forces for all chemical reactions. The first is enthalpy, and the second is entropy. Entropy is a measure of the disorder of a system, and systems tend to favor a more disordered system. Spontaneous reactions occur without outside intervention. In an isolated system, natural processes are spontaneous when they lead to an increase in disorder, or entropy. They may occur quickly, like the combustion of hydrogen, or slowly, like when graphite turns to diamond. Ex: Ammonium nitrate dissolves spontaneously in water, even though energy is absorbed when this reaction takes place. $\text{H}_2\text{O} \text{NH}_4\text{NO}_3(\text{s}) \rightarrow \text{NH}_4^+(\text{aq}) + \text{NO}_3^-(\text{aq})$ $H_o = 28.05 \text{ kJ/mol}$