

## SECOND LAW of THERMODYNAMICS - ENTROPY

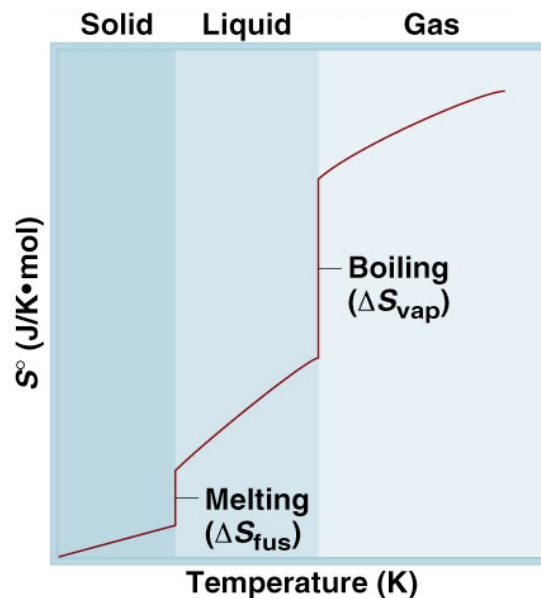
Entropy is a measure of the number of possible states for a system (randomness or disorder)

To calculate entropy changes: 
$$\Delta S = \frac{q_{\text{rev}}}{T}$$

Liquids are more disordered than solids, and therefore have a larger entropy.

Gases are in constant random motion and occupy a large volume, therefore gases are more disordered than liquids and have a larger entropy.

Any process that leads to an increase in the number of particles (atoms, ions, molecules) in the system increases the disorder and has a positive entropy.



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The **SECOND LAW** allows one to predict the direction of natural (spontaneous) processes.

The total entropy of the universe is continually increasing.

or

A process is spontaneous if the entropy of the universe increases.