

Introduction to Entropy

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Focus of Presentation

The focus of these slides is to:

- ▶ introduce the idea of **Entropy**.
- ▶ dispel any preconceived incorrect notions you may have of **Entropy**.

Entropy is more about the dispersal of energy and the resulting change in energy quality

This definition is correct:

“Entropy change is the measure of how more widely a specific quantity of molecular energy is dispersed in a process, whether isothermal gas expansion, gas or liquid mixing, reversible heating and phase change or chemical reactions, (as shown by the Gibbs free energy equation).”

This definition is not all that relevant to macroscopic thermodynamics:

“Entropy is a measure of disorder”

Some Publications on Entropy

1. Shuffled Cards, Messy Desks, and Disorderly Dorm Rooms – Examples of Entropy Increase? Nonsense!¹

The movement of macro objects from one location to another by an external agent involves no change in the objects' physical (thermodynamic) entropy. However, the agent of movement undergoes a thermodynamic entropy increase in the process.

¹Journal of Chemical Education, Vol. 76, pp. 1385-1387, October 1999

2. Disorder – A Cracked Crutch For Supporting Entropy Discussions²

“Entropy is disorder” is an archaic, misleading definition of entropy, dating from the late 19th century before knowledge of molecular behavior, of quantum mechanics and molecular energy levels, or of the Third Law of thermodynamics. It seriously misleads beginning students, partly because “disorder” is a common word, partly because it has no scientific meaning in terms of energy or energy dispersal.

²Journal of Chemical Education, Vol. 79, pp. 187-192, February 2002

3. “Disorder” in Unstretched Rubber Bands?

Which has more entropy? An unstretched rubber band or a stretched rubber band and why?