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Ch 20: The Second Law of Thermodynamics

Entropy

The measure of disorder, associated with temperature, from one state to another.

It is quantified by the ratio of heat flow (Q), at a temperature (T), denoted by (S).

Not a physical quantity, because it is dependent on a change in state.

What do we know if this quantity is equal to 0?

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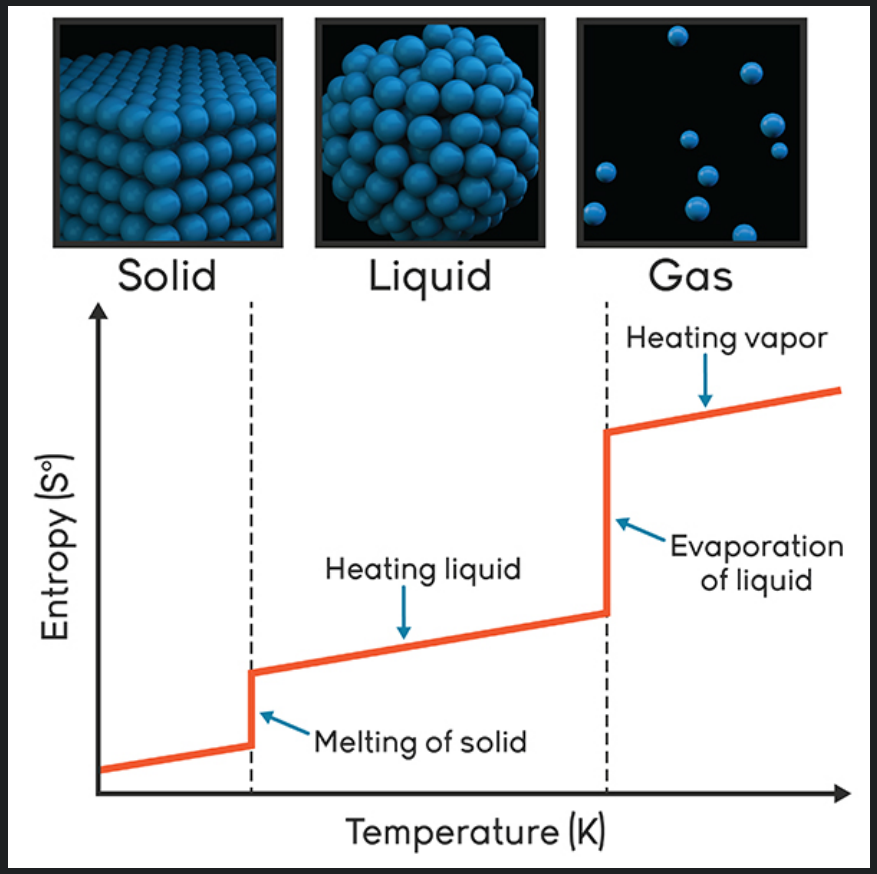
Ch 20: The Second Law of Thermodynamics

Entropy, Phase, & Temperature



http://www.learner.org/courses/chemistry/images/lrg_img/Entropy_phases.jpg

Increasing the thermal energy of a body causes phase transitions from less entropic phases to greater.

What are the vertical lines on the graph?

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Ch 20: The Second Law of Thermodynamics

Kelvin Temperature Scale

$$T_C / T_H = |Q_c| / |Q_H| = - Q_C / Q_H$$

Entropy Equations

$$\Delta S = \int_1^2 (dQ/T) = \int_1^2 (nC_p/T)dT = \int_1^2 (nC_v + nR/T)dT$$

$$\Delta S = S_1 - S_2 = Q/T$$

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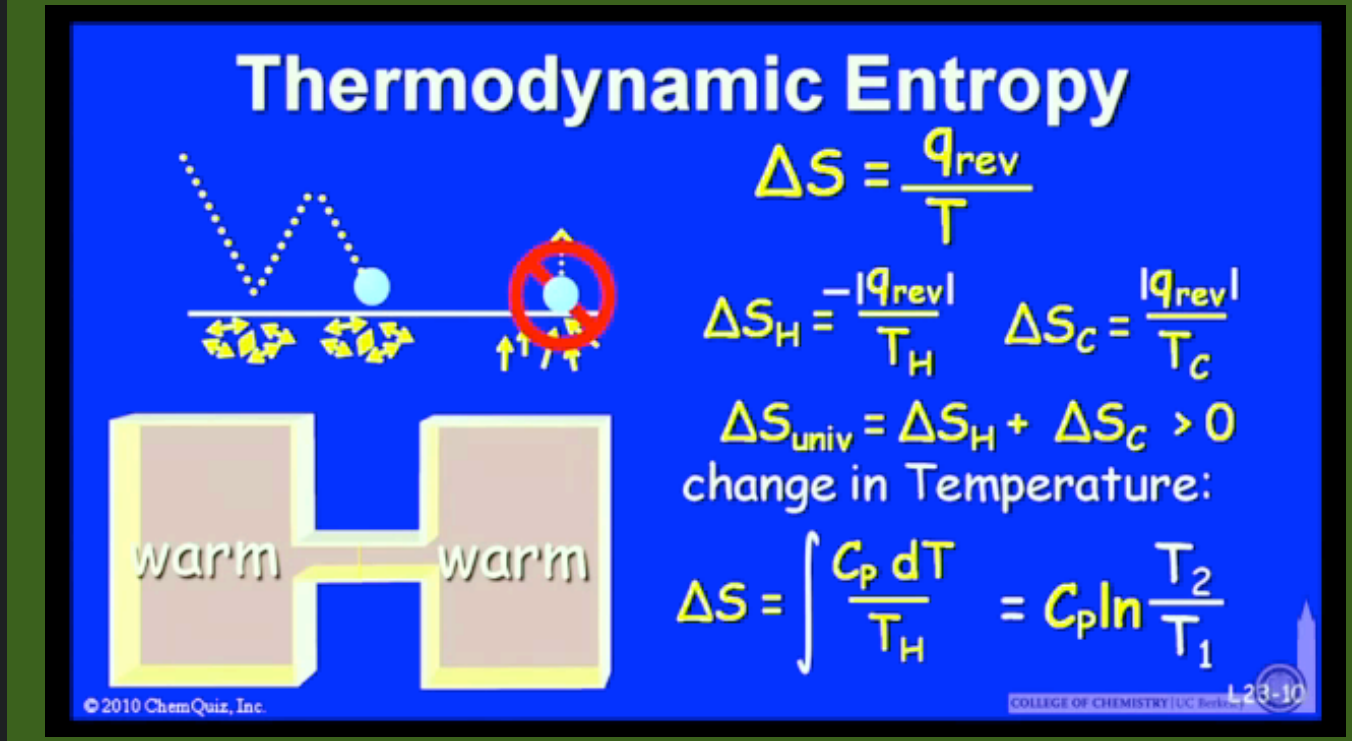
Ch 20: The Second Law of Thermodynamics



YouTube. UC Berkley. "First Law of Thermodynamics" Online video clip. *YouTube*, 15 August 2012. Web. 13 September 2014.

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Work, Energy, Entropy

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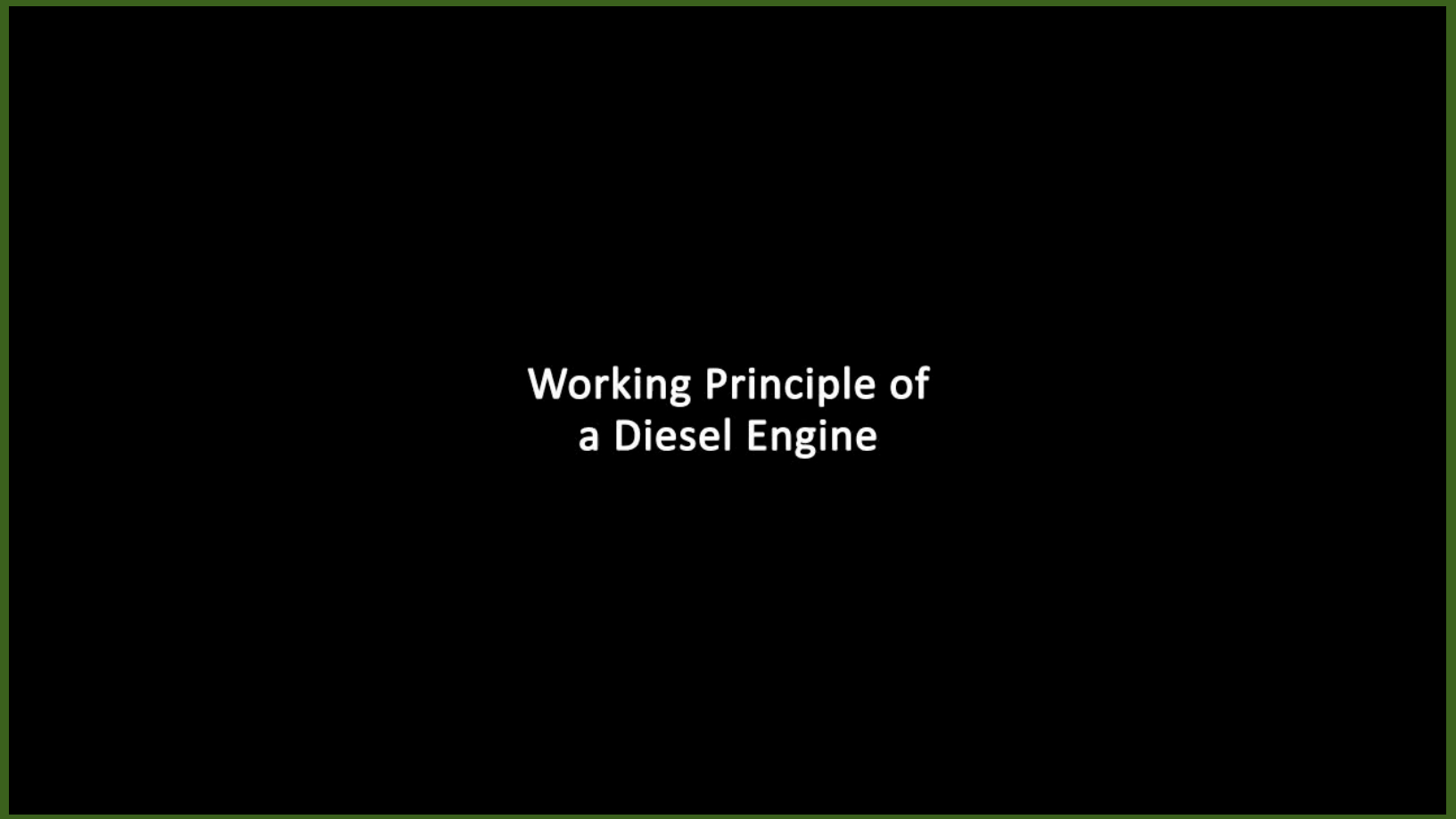

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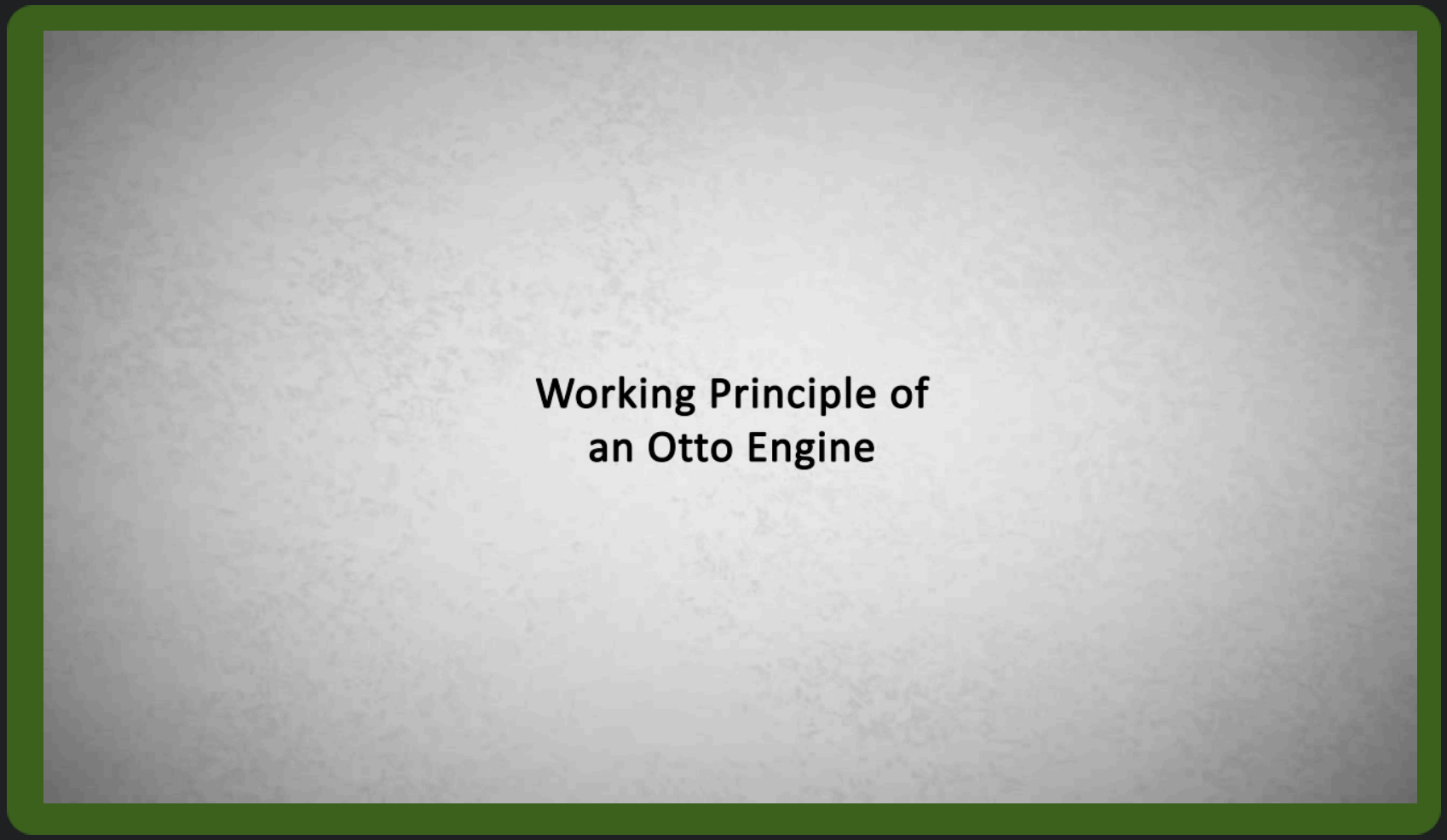

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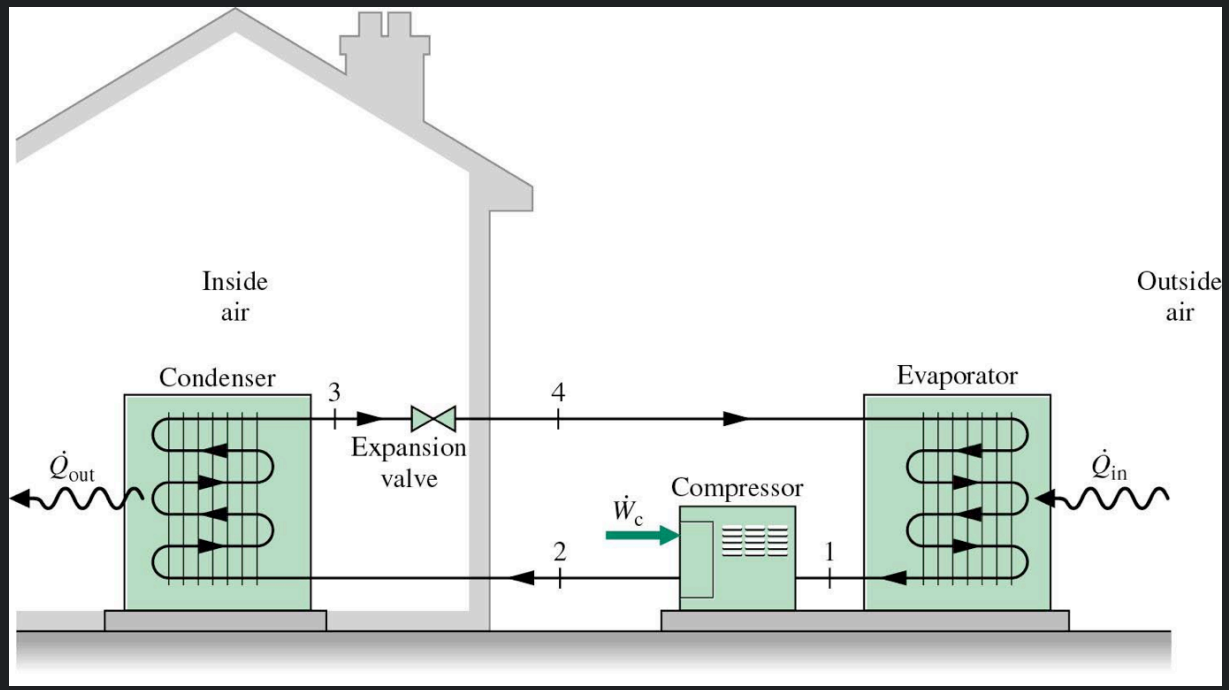
Entropy from Refrigeration



http://www.mae.wvu.edu/~smirnov/mae320/figs/F10-11.jpg

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Summary

★Entropy Formula

★Phase & Temperature

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Citation

Young, Hugh D., and Roger A. Freedman. University Physics with Modern Physics. 13th ed. Harlow: Addison-Wesley, 2011. Print.

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