

Bonus

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Given the following values at 25 °C and 1 atm pressure:

$$\Delta H_{\text{H}_2\text{O}(l)} = -68.32 \text{ kcal}$$

$$\Delta H_{\text{H}_2\text{O}(g)} = -57.80 \text{ kcal}$$

$$S_{\text{H}_2\text{O}(l)} = 16.72 \text{ cal}$$

$$S_{\text{H}_2\text{O}(g)} = 45.11 \text{ cal}$$

And given: $\Delta G = \Delta H - T\Delta S$

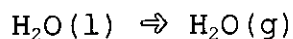
ΔG = Gibb's Free Energy ($\Delta G \leq 0$ for spontaneity)

ΔH = Change in Enthalpy

T = Temperature in Kelvins

ΔS = Change in Entropy

Calculate the temperature above which the physical change of



becomes spontaneous!!!

7. Given that:

- a) $\Delta G = \Delta H - T\Delta S$ where: ΔG = Gibb's free energy (J)
 ΔH = Enthalpy (J)
T = temperature (K or °C)
 ΔS = Entropy

b) $\Delta G < 0$ for a spontaneous reaction

c) ΔH value is 10 times more significant than the ΔS value

State what the sign (+ or -) is for each of the following situations:

Situation	ΔH sign	ΔS sign
evaporation of any liquid to a gas		
combustion of a hydrocarbon		
solidification of a liquid to a crystal solid		
dissolving of a salt in water becomes cold		
dissolving of a salt in water becomes hot		

Note that this question tests your understanding of chemical potential energy in the ΔH column and your understanding of entropy in the ΔS column.