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gas phase has more options for positions than the same atom in a solid phase. This is why gases have more entropy than solids. In reactions, the positional probabilities must be compared for all the reactants to the products produced. Therefore, if the reaction involves only gases, the entropy is related to the total number of moles on either side of the reaction. Learn How to Solve an Entropy Change Problem Find the change in entropy if 500 g of water at 80°C is added to

300 g of water at 20°C. The total amount of water is 800g, so the final temperature of the system is given by  $5 \cdot 353K + 3 \cdot 8 \cdot 293K = 330.5K$  For  $m_1 = 500$  g and  $m_2 = 300$  g, the entropy change is given by  $\Delta S = \int \frac{dQ}{T} = 2330.5$  353 Problem Set 12 Solutions - Open Yale Courses Fundamentals of Engineering Thermodynamics (6th Edition) Edit edition. Problem 36P from Chapter 6: Applying the Entropy Balance: Closed Systems A closed system ... Get

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frequencies):  $(1)(2/4) + (2)(3/8) + (6)(4/16) + (4)(5/32) = 1/2 + 3/4 + 3/2 + 5/8 = 27/8$  bits. Exercise Problems: Information Theory and Coding 4 HCN (l) + 5 O<sub>2</sub> (g) 2 H<sub>2</sub>O (g) + 4 CO<sub>2</sub> (g) + 2 N<sub>2</sub> (g) • 1) Determine, just by looking at this equation whether  $\Delta S$  is positive or negative. POSITIVE - although it is 9 molecules going to 8, there is a liquid Enthalpy/Entropy/ Gibb's Free Energy Figure 20.9 The small increase in entropy when ethanol dissolves in water.



Ethanol (A) and water (B) each have many H bonds between their own molecules. In solution (C) they form H bonds to each other, so their freedom of motion does not change significantly.

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Find the change in entropy if 500 g of water at 80oC is added to 300 g of water at 20oC. The

total amount of water is 800g, so the final temperature of the system is given by  $5 \cdot 353K + 3 \cdot 293K = 330.5K$  For  $m_1 = 500 \text{ g}$  and  $m_2 = 300 \text{ g}$ , the entropy change is given by  $\Delta S = \int \frac{dQ}{T} = 330.5 \cdot 353$

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the other energetics of dissolution are favorable, this increase in entropy means that the conditions for solubility will always be met.

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The value of the entropy corresponds exactly to random mixing for ideal solutions and for regular solutions, and approximately so for many real solutions. For binary mixtures the entropy of random mixing can be considered as a function of the mole fraction of one

component.

### Entropy Problems And Solutions

Marginal entropy of Y is  $1/2 + 1/2 + 3/8 + 3/8 = 7/4$  bits. (c) Joint Entropy: sum of  $-\log p$  over all 16 probabilities in the joint distribution (of which only 4 different non-zero values appear, with the following frequencies):  $(1)(2/4) + (2)(3/8) + (6)(4/16) + (4)(5/32) = 1/2 + 3/4 + 3/2 + 5/8 = 27/8$  bits.

### Chapter 20: Entropy and the Second Law of Thermodynamics

The entropy of a reaction

refers to the positional probabilities for each reactant. For instance, an atom in its gas phase has more options for positions than the same atom in a solid phase. This is why gases have more entropy than solids. In reactions, the positional probabilities must be compared for all the reactants to the products produced.

Therefore, if the reaction involves only gases, the entropy is related to the total number of moles on either side of the reaction.

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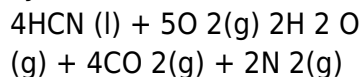
define the entropy in a system: (1) In terms of the system's temperature and the energy change the system gains or loses as heat, or; (1) By counting the ways in which the components of the system can be arranged.

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•1) Determine, just by looking at this equation whether  $\Delta S$  is positive or negative. POSITIVE -although it is 9 molecules going to 8, there is a liquid

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Franck Barthez Assaf Naorx Abstract It is shown that if  $X_1; X_2; \dots$  are independent and identically distributed square-integrable random variables then the entropy of the normalized sum  $\text{Ent} \mu_{X_1} + \dots + \mu_{X_n} p_n$  is an increasing function of  $n$ . This ...

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Figure 20.9 The small  
increase in entropy when  
ethanol dissolves in  
water. Ethanol (A) and

water (B) each have many  
H bonds between their  
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has a weight of 10 lbf on  
the moon, what would the  
same object weigh on  
Jupiter? Jupiter 22Moon c  
ft ft lbf-ft g =75 g =5.4 g  
=32 sec sec lbf-sec<sup>2</sup> c



moon cmoon Jupiter

Jupiter c mg Wg10×32 W  
= m = = 59.26 lb gg5.4

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