General Chemistry II Practice Problems

1. (*e1, sp15l*) For each of the following compounds, identify the strongest intermolecular force

   CH_4 | CH_2F_2

   CF_4 | BaF_2

   and then arrange them from lowest boiling point to highest boiling point

   __________ < __________ < __________ < __________

   Which compound did you pick as having the lowest boiling point? ____________________

   Now take us through your reasoning for picking that compound.

   Which compound did you pick as having the highest boiling point? ____________________

   Now take us through your reasoning for picking that compound.

   Draw a picture showing a hydrogen-bonding interaction that can occur between water and one of the above compounds. Use a dashed line to show the H-bonding interaction between specific sites on water and the compound you selected.

2. (*e1, sp14h*) For each of the following compounds, identify the strongest intermolecular force

   CH_3F ____________________________ CsF ____________________________

   CH_3CH_3 ____________________________ CH_3OH ____________________________

   Now order these compounds from lowest boiling point to highest boiling point

   __________ < __________ < __________ < __________

3. (*e1, sp15l*) Gunnison Bay, the north arm of Great Salt Lake in Utah, has a roughly constant salinity of about 28%. In other words, 100 g of water from Gunnison Bay consists of 28 g of salt and 72 g of water.

   A. Let's assume that all of the salt in Gunnison Bay is sodium chloride, NaCl, and that we can ignore any molecular solutes (for example, dissolved gases). The coldest day on record for Salt Lake City is –30°F, on February 9, 1933. That's –34°C (you're welcome).

      Was it cold enough to freeze a cup of water from Gunnison Bay on February 9, 1933?

      1. Calculate the freezing point temperature of water taken from Gunnison Bay. For water, $K_f = 1.86$ °C/ m and $K_b = 0.52$ °C/ m.
      2. Was it cold enough to freeze a cup of water from Gunnison Bay on February 9, 1933?

   B. The assumption we made in Part A is not a very good one. The salt includes a number of other compounds besides NaCl. Assuming the only other major component is $MgCl_2$, will the freezing point be higher or lower than what you calculated in Part A? Explain your reasoning with math or words, but be clear. Take us stepwise through your reasoning.

4. (*e1, sp16l*) Physical Properties.

   A. If you heat 100 mL of water, raising the temperature from 25°C to 50°C, what effect will that have on the following properties?

1. average kinetic energy	increase	decrease	remain the same
2. attractive forces between the molecules	increase	decrease	remain the same
3. melting/freezing point	increase	decrease	remain the same
4. boiling point	increase	decrease	remain the same
5. vapor pressure of water at equilibrium	increase	decrease	remain the same
6. viscosity	increase	decrease	remain the same

   B. If you take 100 mL of water at 25°C and enough of a nonvolatile solute to make a 0.1 *M* solution, what effect will that have on the following properties?

1. melting/freezing point	increase	decrease	remain the same
2. boiling point	increase	decrease	remain the same
3. vapor pressure of water from the solution, at equilibrium	increase	decrease	remain the same

5. (*e1, sp12h*) Intermolecular Forces.

   A. Give the dominant intermolecular force for each of the following compounds containing fluorine.

      1. HF ____

      2. F_2 ____

      3. SF_2 ____

      4. SrF_2 ____

      5. KrF_2 ____

      Which of the above compounds will be most soluble in hexanes, $C_6H_{14}(l)$? __________________

      Which of the above compounds will be least soluble in hexanes, $C_6H_{14}(l)$? __________________

   B. At room temperature, NF_3 is a gas (BP = −129°C), but NCl_3 is a liquid (BP = 71°C).

      1. Which of these compounds experiences the greatest intermolecular force? ________

      2. Account for the difference in boiling points for the two compounds in terms of specific intermolecular forces.

      3. Which of these compounds is expected to have the highest...

         ΔH_{vap}?________ vapor pressure?________ viscosity?________ surface tension?________

6. When we looked at the series of compounds NH_3, PH_3, AsH_3, and SbH_3 in class. The boiling point increased from PH_3 to AsH_3 to SbH_3, but NH_3 had the highest boiling point of the four.

   Explain the trend and why NH_3 is an exception.

   If, however, you looked at the trend for the compounds $N(CH_3)_3$, $P(CH_3)_3$, $As(CH_3)_3$, $Sb(CH_3)_3$, the boiling point increases as you go down the periodic table and $N(CH_3)_3$ is <u>not</u> an exception. Explain.

7. Which compound is expected to have the highest boiling point, CO_2 or SO_2? Explain your reasoning.

8. For each of the following pairs of molecules, identify the dominate intermolecular force, and answer any associated questions.

   (a) KNO_2 ______________________ CH_3NO_2 ______________________

   Which compound do you expect to have the highest melting point?

   (b) CH_3CH_2OH ______________________ CH_3OCH_3 ______________________

   Which compound do you expect to have the highest boiling point?

   (c) KF ______________________ BrF ______________________

   Which compound do you expect to have the greatest vapor pressure?

   (d) NH_3 ______________________ N_2 ______________________

   (e) CF_4 ______________________ CCl_4 ______________________

   (f) HCN ______________________ KCN ______________________

9. For each of the following compounds, identify the strongest intermolecular force

   LiCl ______________________ CH_3CH_3 ______________________

   CH_3OH ______________________ CH_3F ______________________

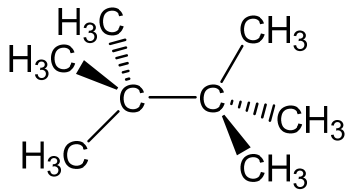
   and then arrange them from lowest boiling point to highest boiling point

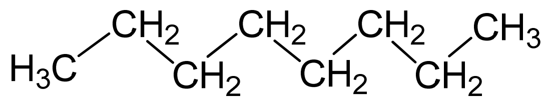
   ____________ < ____________ < ____________ < ____________

10. For each of these questions, explain your reasoning in terms of the IMFs involved. Be brief, but in your effort to be brief, do not simply state the IMF; say why that IMF applies to those particular compounds.

    (a) Account for the observation that the boiling point of sulfur tetrafluoride is significantly higher than the boiling point of sulfur hexafluoride: –38°C for SF_4 vs –64°C for SF_6. A complete answer will include drawings showing the geometries of these compounds.

(b) Circle the molecule expected to have the highest vapor pressure.





Briefly explain your reasoning (do not just say what is different about these molecules – explain why that difference affects the IMF and how that in turn affects the relative vapor pressures).

11. Methanol, CH_3OH, at 25^0C was poured into a container. The container was sealed, and methanol evaporated until a liquid-vapor equilibrium as established. How would the following changes affect the vapor pressure at equilibrium?

(a) The volume of the container is doubled while maintaining the temperature at 25^0C. Assume that both the liquid and vapor are still present after equilibrium is reestablished.

(b) The container is returned to the original size and cooled to 15^0C.

In part A, why is it important to know that “both the liquid and vapor are still present”?

12. (*e1, sp16l*) In class we discussed three techniques for purifying reaction products (crystallization, chromatography, and distillation), all of which exploit intermolecular forces, but I forgot to mention the simplest technique for purification: washing the product with an appropriate solvent. Let’s correct that oversight now.

A. A common technique used to “dry” an ionic product precipitated from water is to collect the solid product and wash it with diethyl ether, $CH_3CH_2OCH_2CH_3$. Explain how washing with this solvent can dry a damp ionic solid.

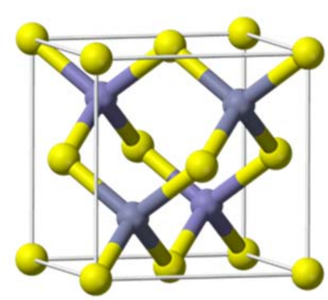
B. You prepared an organic compound that is insoluble in water, but it is contaminated with trimethyl-ammine, $(CH_3)_3N$, one the reagents used in the synthesis. You recall that such amines are bases, hence they react with acids to form salts:

$$(CH_3)_3N + HCl \rightarrow (CH_3)_3NH^+, Cl^-$$

So you decide to wash your product with a dilute solution of HCl(*aq*). Why does washing with HCl(*aq*) remove the $(CH_3)_3N$ impurity?

13. (*e1, sp14h*) Zinc(II) sulfide, ZnS, can form in two different crystalline structures: wurtzite, and sphalerite, also known as the zinc-blende structure.

A. The unit cell for the sphalerite structure is shown on the right.



1. How many Zn^{2+} ions (darker shade) are contained in the unit cell?

2. How many S^{2-} ions (lighter shade) are contained in the unit cell?

3. How many ZnS formula units are contained in the unit cell?

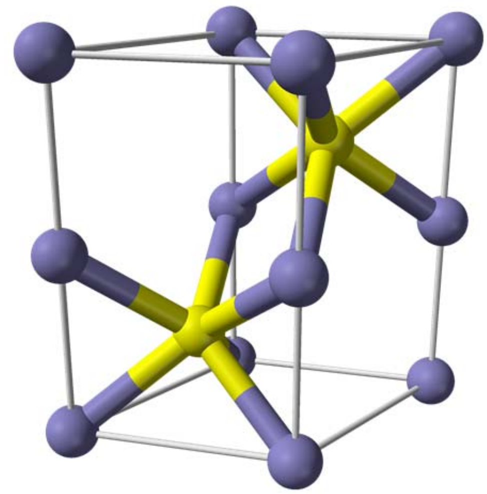
B. X-ray diffraction studies of the sphalerite unit cell for the mineral zinc blende show that length of the edge of the unit cell is 540 pm. Calculate the density of zinc blende in g/cm^3.

Does the density you calculated seem reasonable? Explain.

14. (*e1, sp15l*) We learned in Gen Chem I that transition metals can have more than one stable oxidation state, so when we name ionic compounds containing transitional metal cations we have to indicate the oxidation state of the metal using a Roman numeral.

    Let's break that rule.

    The unit cell of one form of iron sulfide is shown on the right. The two spheres in the center of the unit cell with six "bonds" each correspond to iron ions.

    So there are two iron ions in the unit cell. (You're welcome.)

    A. How many sulfide anions are contained in the unit cell?

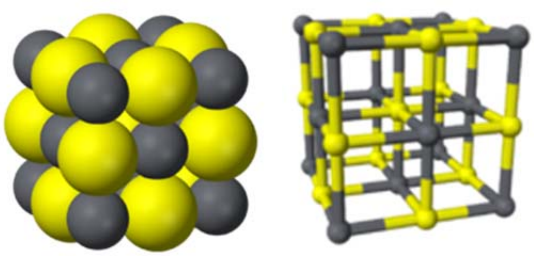
    B. What is the formula, Fe_xS_y, of this iron compound?

    C. Calculate the mass of the unit cell in grams.

    D. The density of the unit cell is 4.84 g/cm^3. Calculate the volume of the unit cell in pm^3 (not cm^3).

    E. Why didn't I ask you to calculate the length of one side of the unit cell?

15. (*e1, sp12h*) The unit cell for lead(II) sulfide is shown on the right, but as a space-filling model and as a ball-and-stick model.

    A news release issued by the American Institute of Physics early this year and picked up by ChemistryTimes ("A Baby Crystal is Born") described a computational study published in the *Journal of Chemical Physics* that found "$(PbS)_{32}$ is the smallest stable unit that possesses both the same cubic structure and coordination number as the bulk crystal."

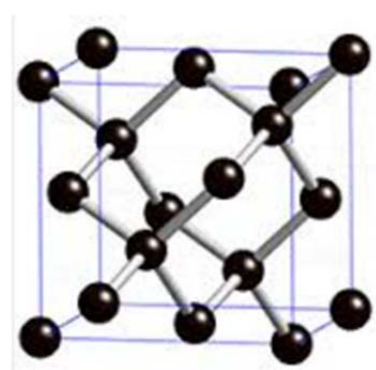
    A. How many Pb^{2+} ions (larger spheres) and S^{2-} ions (smaller spheres) are contained in one unit cell?
    (Be sure to show your work.)

    B. How many unit cells would it take to form one of the $(PbS)_{32}$ "baby crystals" described above?

    C. Given that the density of lead(II) sulfide is 7.60 g/cm^3, how many of the $(PbS)_{32}$ "baby crystals" would be contained in one cubic centimeter of lead(II) sulfate?

    D. The ionic radii of Pb^{2+} and S^{2-} for this lattice are 133 pm and 170 pm, respectively; therefore, we can estimate the length of one side of the unit cell to be $2r_{Pb2+} + 2r_{S2-}$ = 2(133 pm) + 2(170 pm) = 606 pm. Calculate the density of PbS(*s*). How well does it agree with the value given in Part C?

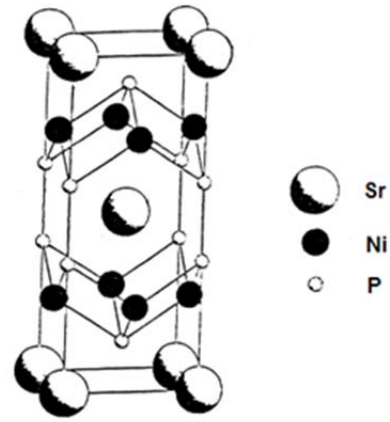
16. (*e1, sp16l*) Nanoparticles can be crystallized in unit cells just like atoms. A recent study published in *Inorganic Chemistry* described nanoparticles that crystallized in the same unit cell as diamond (right).

    See: Diamond family of nanoparticle superlattices. *Science*, February 5 **2016**, *351*, 582-586.

    How many nanoparticles would be contained in one unit cell?

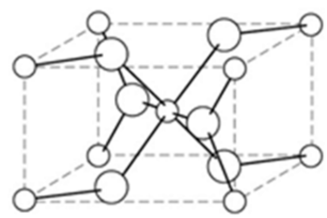
17. The magnetic properties of compounds that crystallize in the unit cell shown on the right are of considerable interest to folks in the materials science community (*Phys. Rev. B*, **2009**, *79*, 134507).



(a) Determine how many strontium, nickel, and phosphorous atoms are contained in the unit cell.

(b) Given that strontium is Sr^{2+} and phosphorous is P^{3-}, what is the charge of the nickel ion?

18. The unit cell for rutile, TiO_2, is shown on the right.



(a) How many titanium ions are contained in one unit cell?

(b) How many oxygen ions are contained in one unit cell?

(c) How many TiO_2 formula units are contained in one unit cell?

(d) The density of rutile is 4.23g/cm^3. Calculate the volume of the unit cell in pm^3.

(e) It would be difficult to calculate the dimensions of the unit cell. Why?

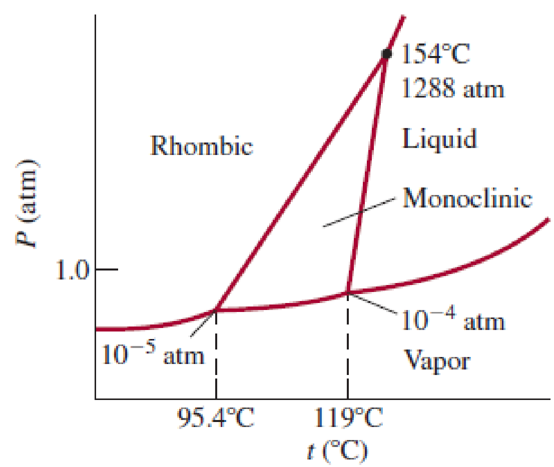
19. (*e1, sp12h*) Sulfur can exist in the gaseous state (a vapor), the liquid state, and in one of two solid states: rhombic and monoclinic. A phase diagram for sulfur is shown below.

A. What is the stable form of sulfur at room temperature?

B. Which state of sulfur has the greatest density: rhombic, monoclinic, or liquid?

C. What is the maximum pressure at which rhombic sulfur will sublime to form sulfur vapor?

D. Is there a temperature and pressure at which all four states can coexist? If so, circle that point on the phase diagram.



20. (*e1, sp12h*) Mercury is a neurotoxic metal with a reasonable high vapor pressure, at least for a metal. The vapor pressure at 25°C is 0.0017 mmHg. But what about the vapor pressure of mercury in a hot factory?

A. Will the vapor pressure of mercury be higher or lower in the factory? ___________________________

B. Estimate the temperature of a hot factory in Celsius. ____________________

Now using your estimated temperature and the information provided, set up the equation that you would solve to calculate the vapor pressure of mercury in the factory. Plug in the correct numbers in the correct places, using "P" as the vapor pressure in the factory, but you do not need to solve the equation. The enthalpy of vaporization of mercury is 59.11 kJ/mol.

21. (*e1, sp15l*) Mercury is a neurotoxic metal with a reasonable high vapor pressure, at least for a metal. The vapor pressure at 25°C is 0.0017 mmHg. But what about the vapor pressure of mercury in a factory where the temperature is 32°C?

    A. Will the vapor pressure of mercury be higher or lower in the factory? ___________________________

    Explain beyond simply saying that vapor pressure increases or decreases with temperature. Explain why.

    B. Set up the equation that you would solve to get the vapor pressure of mercury in the factory. Plug in the correct numbers in the correct places, using "P" as the vapor pressure in the factory, but you do not need to solve the equation. The enthalpy of vaporization of mercury is 59.11 kJ/mol.

22. (*e1, sp15l*) Perfluorinated compounds are hydrocarbons where most or all of the hydrogens have been replaced by fluorine atoms. Perfluorinated solvents have a number of interesting and exploitable properties. For example, oxygen is very soluble in perfluorinated solvents, and they have been investigated as temporary means of supplying oxygen in the case of very premature births before the lungs are fully developed.

    The Henry's law constant for C_7F_{14} is 2.5×10^{-2} mol/L·atm at 25°C, roughly ten times greater than the Henry's law constant for water at that temperature.

    A. Calculate the concentration in *M* of oxygen dissolved in C_7F_{14} exposed to air at 25°C. Air is 21% oxygen.

    B. The concentration of oxygen in the umbilical vein is in the neighborhood of 20 mg/100 mL of blood.

    Convert your answer from Part A to mg/100 mL of blood.

    Is the concentration high enough to support the fetus?

23. (*e1, sp15l*) Which of the following aqueous solutions, listed in alphabetical order according to the anion, would have the highest osmotic pressure: 0.10 *M* $NaClO_4$, 0.10 *M* $NaNO_3$, 0.10 *M* Na_3PO_4, or 0.10 *M* Na_2SO_4?

    ____

    Explain why you picked that solution.

    Which of the following would be <u>most</u> soluble in a hydrocarbon (C_xH_y) solvent: KI, I_2, or NaI_3?

    ____

    Explain your reasoning.

24. (*e1, sp14h*) We mentioned in class that the "fish kills" near electrical power plants are generally caused by the release of hot water back into the nearby water supply, reducing the solubility of oxygen in the water.

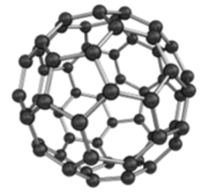
    Or maybe that's just what they tell us to cover up the real reason. Let's check it out.

    A. The temperature of the effluent water from an electrical power plant is around 40°C, and the Henry's law constant for O_2 at that temperature is 9.9×10^{-4} mol/L·atm. Calculate the solubility of O_2 in water at 40°C.

    B. Oxygen concentrations of 5 mg/L, or less, are considered to be unsafe for most fish. Concert this concentration to molarity.

    C. Comment on the possibility that the fish kills near power plants are caused by low oxygen concentrations where the water is returned to its source. Back up your argument with the concentrations you calculated above.

25. (*e1, sp14h*) Buckminsterfullerene, or "buckyball," is a remarkable molecule (thanks Dr. Kroto), but some claims strain credibility. For example, a fairly recent journal article (*Biomaterials*, **2012**, *33*, 4936-4946) states that C_{60} dissolved in olive oil at a concentration of 0.8 mg/mL and administered orally to mice "almost doubles their lifespan." That study lead to the product shown on the right, below the buckyball structure. You will not be shocked to learn that this "dietary supplement" carries the label "***These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.***"



A. What would the concentration of C_{60} be in mol/L?

B. Given that the density of the solution is 0.92 g/mL, calculate the molality of the solution.

C. The freezing point of pure olive oil is 2.8°C. Based on similar solvents, let's assume that K_f is 3.9 °C/*m*. Calculate the decrease in freezing point for the solution used in this study. (You will need one of the concentrations you calculated above. This question would be marked assuming the concentration you calculated is correct. If you were not able to calculate the concentration you need, make up a concentration, write it (including units) in the box, and use that concentration to answer part C.)

D. Olive oil is kind of an unusual solvent, but it really is used in medicine. For example, strong antibiotics are dissolved in olive oil in order to administer them orally to very young children (for example, if the child is exposure to someone with bacterial meningitis).

Why do you think they dissolved the C_{60} in olive oil instead of water?

26. (*e1, sp12h*) The chemistry and biochemistry of nitrogen oxide, NO(*g*), has received considerable attention over the past ten years as researchers have discovered more about its role as a neurotransmitter in biology.

A. Calculate the concentration of nitrogen oxide in water if the partial pressure of NO(*g*) is 47 mmHg. The Henry's law constant for nitrogen oxide is 1.9×10^{-3} mol/L · atm.

B. Speculate on why nitrogen oxide is more soluble in water than either oxygen or nitrogen, as shown by the constants: $k(O_2) = 1.3 \times 10^{-3}$ mol/L · atm; $k(N_2) = 6.8 \times 10^{-4}$ mol/L · atm.

C. The solubility of hydrogen chloride, HCl(*g*), in water is much greater, with $k(\text{HCl}) \approx 20$ mol/L · atm. A 10.00% by mass aqueous solution of hydrogen chloride has a density of 1.046 g/mL. What is the molarity of the solution?

27. (*e1, sp16l*) Carbon dioxide is much more soluble in water than oxygen, $O_2(g)$, which can cause problems for aquatic life, as we considered in recitation. Mammals (like us) also rely on oxygen to be carried by an aqueous medium (blood). Life cheats by using hemoglobin (Hb), a globular protein, to bind the oxygen, getting more into the blood stream. The mass of Hb was originally determined using osmotic pressure.

A. A 0.263 g sample of Hb was dissolved in 10.0 mL of water, and the resulting osmotic pressure was measured to be 7.51 mmHg at 25°C. What is the molar mass of Hb?

B. Hb consists of four subunits. In the unlikely event that some of the Hb dissociated into subunits, how would that affect the osmotic pressure? Explain your reasoning.

28. (*e1, sp14h*) We mentioned in class that the concentration of the saline solutions used to prepare IV bags is 0.9 g NaCl per liter of solution. You have already demonstrated your ability to carry out unit conversions and calculate the properties of solutions, so you do not have to do any calculations here. Instead, state whether the solution properties below will increase, remain the same, or decrease. Where asked, explain your reasoning, without calculating the actual values of the solution properties (but read part C carefully).

   A. The temperature of the saline solution is increased from 24°C (room temperature, in that room) to 37°C.

      1. Will the osmotic pressure increase, remain the same, or decrease? ____________________

         Explain your reasoning.

      2. Will the vapor pressure increase, remain the same, or decrease? ____________________

         Explain your reasoning.

   B. The salt is changed from 0.9 g NaCl to 0.9 g KCl.
      (Relax... we're not going to use this solution or the next one in an IV bag.)

      1. Will the osmotic pressure increase, remain the same, or decrease? ____________________

         Explain your reasoning.

      2. Will the vapor pressure increase, remain the same, or decrease? ____________________

         Explain your reasoning.

   C. The salt is changed from 0.9 g NaCl to 0.9 g $CaCl_2$.

      Will the osmotic pressure increase, remain the same, or decrease? ____________________

      To answer part C and explain your reasoning, you will need to do a simple calculation, but it shouldn't be necessary to calculate the osmotic pressure of the solutions. However, it's your call as to the best way to...

      Explain your reasoning.

29. (*e1, sp16l*) Coca-Cola took a public relations hit a few months ago when it was discovered that their "scientists" stated that obesity was due to insufficient exercise and not sugary soft drinks (*New York Times*, August 9, 2015). Let's put the science back in the crown jewel of soft drinks.

   A. The partial pressure of carbon dioxide in the headspace of bottled Coke (the space above the liquid) is 3-4 atm. So let's assume 3.5 atm. The Henry's law constant for $CO_2(g)$ at 20°C is 3.91×10^{-2} mol/L·atm. Calculate the solubility (mol/L) of carbon dioxide in water at 20°C.

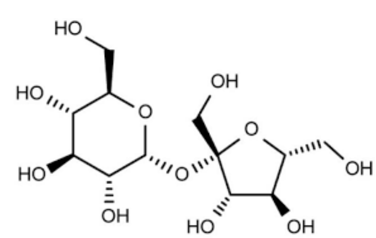
   B. How will the following affect the vapor pressure of CO_2 in the headspace?

      1. Allow the bottle and its contents warm up to 25°C. increase decrease remain the same

         Explain. *(Don't just say heating makes the vapor pressure go up or down or whatever. Explain why.)*

      2. Shake the bottle (the temperature remains at 20°C). increase decrease remain the same
         Explain.

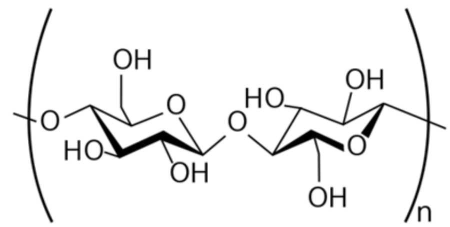
   C. And why is sugar so darn soluble in water?



sucrose

30. (*e1, sp12h*) The Fabric of Our Lives.

A. Cotton is around 90% cellulose, a polymer of glucose sugar units. The structure of cellulose is shown on the right.



Why is cotton able to absorb so much water?

B. While you were out hiking, you got caught in a rain storm, and your cotton shirt absorbed 475 mL of water at 15°C. You were uncomfortable, but you knew your shirt would eventually dry out because evaporation occurs at temperatures well below the boiling point of water.

Data for Water	
molar mass	18.02 g/mol
specific heat of water	4.184 J/g·°C
ΔH_{vap}	40.79 kJ/mol

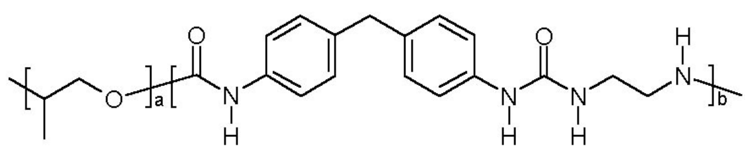
You can estimate the amount of heat required to dry your shirt as the heat necessary to raise the temperature of the water from 15°C to body temperature (37°C), plus the amount of heat required to convert the water to water vapor. You may assume that ΔH_{vap} is independent of temperature (as we will see later in the semester, this is not a horrible assumption).

So, based on the above assumptions, how much heat is required to dry out your shirt?

C. The Butterfinger is, of course, the crowning achievement in candy bar science. A regular Butterfinger contains a mere 270 food Calories, corresponding to 1100 kJ. Assuming all of the energy to evaporate the water came from your body heat, how many regular Butterfinger candy bars would you need to eat to replenish that energy?

D. Next time you went hiking you made a point to wear a shirt made of a blend of cotton and elastane, the polymer shown below.

What is the advantage of this polymer over cotton?



31. The volatility of hydrocarbons can be a cause for concern due to both the inhalation of these vapors and the potential for forming explosive hydrocarbon-air mixtures.

(a) The molar enthalpy of vaporization of hexane (C_6H_{14}) is 28.9 kJ/mol, and its normal boiling point is 68.73°C. What is the vapor pressure of hexane at 20°C?

(b) How would the vapor pressure of octane (C_8H_{18}) compare to hexane? Why?

32. Mercury is a neurotoxic metal with a reasonable high vapor pressure, at least for a metal. The vapor pressure at 25°C is 0.0017 mmHg. But what about the vapor pressure of mercury in a hot factory?

(a) Will the vapor pressure of mercury be higher or lower in the factory?

(b) Estimate the temperature of a hot factory in Fahrenheit.

Now calculate the vapor pressure in the factory. The enthalpy of vaporization of mercury is 59.11 kJ/mol.

33. A certain compound has a triple point at 4.5 atm and 151 K, and a critical point at 8.9 atm and 303 K. The density of the solid phase is greater than the density of the liquid phase.

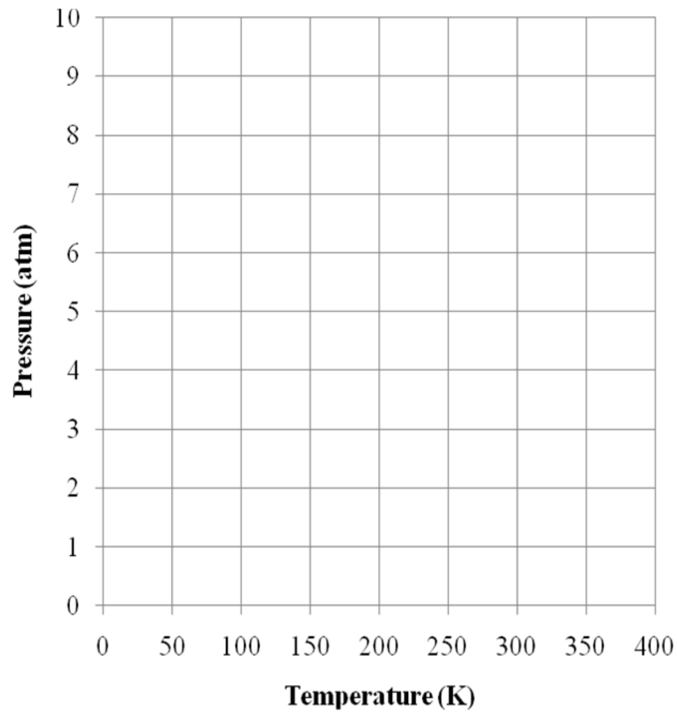
(a) Draw a phase diagram for this compound consistent with the above information. Label the regions corresponding to each phase. Label the triple point and the critical point.

(b) Identify and label the region of the phase diagram where the supercritical fluid would exist.

(c) Based on your diagram, what would be the boiling point of this compound at 6.0 atm?

Would the boiling point increase, decrease, or remain the same if the pressure was increased to 7.0 atm?

(d) What phase change(s) would occur and at what temperature(s) if the temperature was raised from 50 K to 350 K at 3.0 atm?

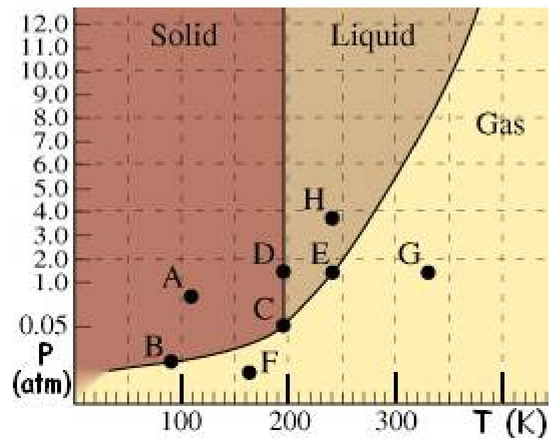


(e) Describe how you could use your phase diagram to estimate ΔH_{vap} for this compound. If you need an equation, show that equation and describe how you would use it, but do not do the math.

34. The phase diagram for ammonia is shown on the right.

(a) Give the letter(s) for the region corresponding to the following:

1. solid only ___________
2. liquid only ___________
3. gas only ___________
4. solid/liquid equilibrium ___________
5. solid/gas equilibrium ___________
6. liquid/gas equilibrium ___________
7. triple point ___________



(b) Comparing the densities of the liquid and solid states, which of the following do you expect to be true? (circle one)

density of liquid NH_3 < density of solid NH_3

density of liquid NH_3 ≈ density of solid NH_3

density of liquid NH_3 > density of solid NH_3

Explain your reasoning.

(c) The normal boiling point of ammonia was given in the previous problem (–33.4°C). Do you expect the boiling point to be higher or lower at 8 atmospheres?

Now calculate the boiling point of ammonia at 8 atm using the C-C equation.

Is your answer consistent with your prediction?