

EXAM #2 STUDY GUIDE

The exam will cover the material found in Chapters 11-13. Remember, the best way to prepare is to complete the OWL assignments and do the optional Chapter Review questions. The following list is provided to help guide your preparation, but may not include everything.

You may bring a calculator and one page of notes. You will be provided with a periodic table and any necessary data- no need to put any data tables on your notes sheet. However, the summary table of cubic unit cells (Table 12.2 on page 12-7 of your book) could be a useful thing to put onto your notes sheet.

Be able to:

- Identify the type(s) of intermolecular forces acting between molecules (of the same type or two different molecules)
- Be able to interpret a plot of vapor pressure vs. temperature (e.g., comparing curves for two different compounds, tell which one has stronger intermolecular forces)
- Given a series of compounds, determine which
 - has the highest/lowest boiling point
 - has the highest/lowest freezing point
 - has the highest/lowest vapor pressure
 - has the highest/lowest enthalpy of vaporization
 - is the most/least soluble in water
- Given a chemical formula, determine
 - whether the molecule can form hydrogen bonds
 - if the molecule is hydrophobic or hydrophilic
 - whether the molecule is soluble in oil or water
- Interpret phase diagrams
 - using a phase diagram, tell what phase/state a material will be in under certain conditions
 - describe what happens to the phase, pressure, or temperature of the material when you move from one point to another on a phase diagram
 - determine the relative density of two phases from the phase diagram (for example, the phase diagram of water shows that water is more dense than ice)
- Given temperature data, tell whether dissolution is exothermic or endothermic
- State whether the dissolution of a particular molecule is enthalpy-favored, entropy-favored, or both
- Determine whether the solubility of a material will increase or decrease as the temperature is increased
- Given the composition of two solutions, determine which will have a higher melting point or boiling point

Things to Know:

- Why oil and water don't mix (in thermodynamic terms)

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- Trends:
 - how vapor pressure changes as you increase intermolecular forces
 - how boiling point changes as you increase intermolecular forces

Calculations you should be prepared to do:

- Determine the chemical formula of a compound from unit cell information
- Determine the volume of a unit cell given the unit cell type and atom radius
- Determine the molarity, molality, mole fraction or weight percent of a component in a solution
- Calculate the solubility of a gas using Henry's Law
- Calculate the vapor pressure of a solution Raoult's Law
- Calculate the boiling point/freezing point of a solution
- Given the necessary information (vapor pressure, etc.) calculate the molar mass of a solute

Terms to Know:

dipole	
dynamic equilibrium	induced dipole (=dispersion)
freezing point	Henry's Law
hydrophilic	micelle
intermolecular forces	hydrogen bond
ion	triple point
metastable	colligative
molality	molarity
mole fraction	weight percent
phase diagram	unit cell
Raoult's Law	solute
solvent	Le Chatelier's Principle
surfactant	hydrophobic
vapor pressure	boiling point