

CH302 Random Musings January 28, 2010

0. Travis is reading this instead of me. This must, therefore, be the beginning of Travis teaching Dr. Laude's class while he begins to sit in a two day meeting on college readiness. Two things: Dr. Laude would not be in a two-day meeting on college readiness if, present company excluded, college students were ready for college. Also, this is the first time in nearly 23 years as a college professor that Dr. Laude has let another human being read his random musings to the class. He hopes Travis tucked his shirt in to do it.

1. Quiz 1 is supposed to occur on Tuesday. Be aware that there is a rich history of things going wrong so that the first quiz of a semester doesn't happen as planned. Travis is personally responsible for many of these gaffes, and I know he is going to claim that absolutely everything is under control, and I know he has a string of one first quiz in a row happening, but I firmly believe Travis is snake bit when it comes to first quizzes. You can always hope, because if he can't get it administered on time and fairly, everyone gets a 40.

2. Here are the question types for Quiz 1. I have made changes to reduce the emphasis on Lecture 4.

From Lecture 1:

Question type 1: Clausius-Clapeyron (know the reasons for the approximations in the derivation)

From Lecture 2:

Question type 2: Interpreting phase diagrams

Question type 3: Calculating ΔH for a substance as T changes across various phase

From Lecture 3:

Question type 4: Theory of dissolving salts in water

Question type 5: Ranking miscibility and solubility in liquids

Question type 6: Theory of dissolving gases in water

From Lecture 4:

Question type 7: Raoult's Law calculation in a binary system

Question type 8: Colligative property calculation

3. By Sunday the following materials will be posted to help you study.

- Lectures 1 through 4 notes on physical equilibria
- Worksheet 2 from 2008 which has 20 questions on physical equilibria
- Worksheet 2 from 2009 that has 20 questions specific to what is on quiz 1 from the first four lectures. (there is no new worksheet on physical equilibria this year since the other two worksheets are just fine.)
- A practice quiz 1 prepared by the TAs will be posted Sunday.
- A practice quiz 1 prepared by Dr. Laude will be posted Saturday in the ChemPortal.

4. Some thoughts on how to study for this course, as prompted by about 10 e-mails from new students wanting to know how to use my course materials. Here was my response:

Some thoughts in how to study for the quiz:

Every time there is a quiz or exam coming up you will receive the following:

1. A list of the question types to be found on the quiz or exam will be listed in the musings at least a week ahead of time.
2. At least one worksheet per week will cover the content material you are expected to learn.
3. At least two practice exams or quizzes (one in the ChemPortal that I write and one the TAs write.) These are questions written specifically for the question types I provide—they will look an awful lot like the kinds of questions you should expect on a quiz.

Obviously when coupled with the lecture notes and e-book material there will be plenty of content to assist you in learning what you need to learn for the quiz.

So how should you go about studying?

My course is structured a bit differently than other courses in the sciences you might have had. I ask the students to focus on learning to do specific things well for a quiz or test. For example, for quiz 1 there are 8 things you need to learn how to do well—always use those question types as your guide to what to emphasize.

You are then free to use any of the materials I provide, from my notes to the text to the worksheets to the practice exams and quizzes, to make yourself confident you can answer the question types on the quizzes and exams. How you choose to read the e-book, or how many problems you do on the worksheet, should be done with this question in mind: do I now know how to do the first question types Dr. Laude asked me to do? When the answer is yes, then move on to the second, and third, and so on.

This is very different from the passive approach to learning many of you developed in high school. A kind of "grazing through the material" which is the traditional idea of sitting down with a text, starting on page 1 of a chapter, and reading all the way till the last page of a chapter. This is just about the worst way I can imagine trying to learn science material since there is more information in any single science text book chapter than anyone (including the authors of the textbook) could hope to put into their brain at one time. The end of this kind of study session usually results in a strong desire to fall asleep, or if you make it till the end of the chapter, a sense of being overwhelmed while at the same time have done very little learning. If you want proof of how little you have learned, after you have graze through a chapter beginning to end. Go to dinner and then afterward ask yourself what you remember from the chapter--probably not much.

So instead, attack quiz 1 as I have described. Look at the first question type, in this case, "**Clausius-Clapeyron (know the reasons for the approximations in the derivation)**" and then figure out what that means by looking at practice quiz and worksheet questions. Use the notes or e-book or lecture video to shore up your background to answer the question.

Get yourself organized for that question by relocating everything that might help answer that kind of question to an index card and make sure you understand what you have written and can repeated it from memory.

And then off to the next question type till you have mastered all 8 for the quiz.

Students who study this way in my class do three things:

1. They spend a lot less time studying.
2. They learn a huge amount of chemistry that they retain rather than forget
3. They get As in the class. (Don't believe me? Ask the 220 students in a class of 480 that got As in the fall.)

5. A thought on mistakes in the materials. I am pretty sure this course is close to number one in the country for most new material produced each week to help you study. The positive side of this is that there is always extra material to help you learn better. The down side is that there are always going to be mistakes when the material is first posted. Please appreciate this and rather than hit your head against a wall when you find an error in the notes, e-mail me so I can correct it for the students.

6. For the new students. I have quite enjoyed my office hours with students this semester. A bit of advice on how to know whether to go to my office or to the classroom for my office hours:

Method 1. I will tell you in the musings and Sunday e-mails each week. For example:

- Next Monday and Tuesday I will hold office hours in my office
- On Wednesday and Thursday before the quiz I will hold them in the assigned classrooms

Method 2. Make up a little poem to assist with a common sense assessment. Here are two I have written:

- If there's a quiz or a test, it's not in Dave's nest
- Is there a quiz or test soon? Go to the classroom.

What does this mean about next week: With a quiz on Tuesday, this means I will hold my office hours Monday and Tuesday in the classrooms, but after the quiz on Tuesday afternoon, will hold them Wednesday and Thursday in my office.

7. Valentine's Day is close at hand and this is your chance to submit your favorite poetry for publication in a special poetry musings on the 12th. Only lovingly sweet poetry will be published at this time. This is your chance, like on radio stations, to dedicate a poem to someone. Then, in the new millennium equivalent of listening to songs dedication by Kasey Kasem in the 80s, you can go to my web site and point out to your beloved, a dedication on my random musings link.

8. Public Service Announcements. Two Announcements: SURGE and Texas Pre-Dental



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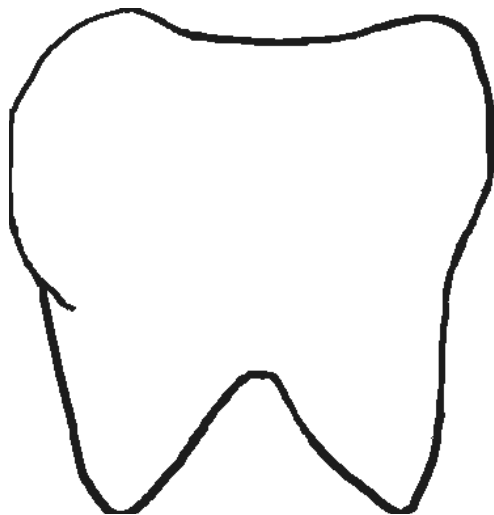


Who are we?

We're **SURGe**, the Science Undergraduate Research Group of UT's College of Natural Sciences. We want to establish, develop and expand upon a community of undergrads engaged in research, undergrads who want to be engaged, and undergrads just curious about what's going on in the great, big world of science today.

What happens at SURGe meetings?

- *Interactive Lectures with current researchers
- *Graduate Student Panels
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- * Fun activities
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- *Q&As about maximizing your research experience



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9. Poetry Corner. For poetry corner today I offer up a pretty funny story told by another professor who teaches freshman chemistry—it is the challenge that every parent, who knows more than is good for them, faces. It also includes a bunch of the stuff I am teaching you right now.

DIALOGUE WITH SARAH, AGED 3: IN WHICH IT IS SHOWN THAT IF YOUR DAD IS A CHEMISTRY PROFESSOR, ASKING "WHY" CAN BE DANGEROUS

By Stephen McNeil

- FROM THE ARCHIVES -

SARAH: Daddy, were you in the shower?

DAD: Yes, I was in the shower.

SARAH: Why?

DAD: I was dirty. The shower gets me clean.

SARAH: Why?

DAD: Why does the shower get me clean?

SARAH: Yes.

DAD: Because the water washes the dirt away when I use soap.

SARAH: Why?

DAD: Why do I use soap?

SARAH: Yes.

DAD: Because the soap grabs the dirt and lets the water wash it off.

SARAH: Why?

DAD: Why does the soap grab the dirt?

SARAH: Yes.

DAD: Because soap is a surfactant.

SARAH: Why?

DAD: Why is soap a surfactant?

SARAH: Yes.

DAD: That is an EXCELLENT question. Soap is a surfactant because it forms water-soluble micelles that trap the otherwise insoluble dirt and oil particles.

SARAH: Why?

DAD: Why does soap form micelles?

SARAH: Yes.

DAD: Soap molecules are long chains with a polar, hydrophilic head and a non-polar, hydrophobic tail. Can you say 'hydrophilic'?

SARAH: Airofawwic

DAD: And can you say 'hydrophobic'?

SARAH: Airofawwic

DAD: Excellent! The word 'hydrophobic' means that it avoids water.

SARAH: Why?

DAD: Why does it mean that?

SARAH: Yes.

DAD: It's Greek! 'Hydro' means water and 'phobic' means 'fear of'. 'Phobos' is fear. So 'hydrophobic' means 'afraid of water'.

SARAH: Like a monster?

DAD: You mean, like being afraid of a monster?

SARAH: Yes.

DAD: A scary monster, sure. If you were afraid of a monster, a Greek person would say you were gorgophobic.
(pause)

SARAH: (rolls her eyes) I thought we were talking about soap.

DAD: We are talking about soap.

(longish pause)

SARAH: Why?

DAD: Why do the molecules have a hydrophilic head and a hydrophobic tail?

SARAH: Yes.

DAD: Because the C-O bonds in the head are highly polar, and the C-H bonds in the tail are effectively non-polar.

SARAH: Why?

DAD: Because while carbon and hydrogen have almost the same electronegativity, oxygen is far more electronegative, thereby polarizing the C-O bonds.

SARAH: Why?

DAD: Why is oxygen more electronegative than carbon and hydrogen?

SARAH: Yes.

DAD: That's complicated. There are different answers to that question, depending on whether you're talking about the Pauling or Mulliken electronegativity scales. The Pauling scale is based on homo- versus heteronuclear bond strength differences, while the Mulliken scale is based on the atomic properties of electron affinity and ionization energy. But it really all comes down to effective nuclear charge. The valence electrons in an oxygen atom have a lower energy than

those of a carbon atom, and electrons shared between them are held more tightly to the oxygen, because electrons in an oxygen atom experience a greater nuclear charge and therefore a stronger attraction to the atomic nucleus! Cool, huh? (pause)

SARAH: I don't get it.

DAD: That's OK. Neither do most of my students.

Stephen McNeil is an Assistant Professor of Chemistry at University of British Columbia Okanagan in Kelowna, British Columbia. His lectures and conversation tend to incorporate a large degree of both gesticulation and pontification, occasionally of a frighteningly unbridled and reckless nature. He often reminds people of his namesake on "Blue's Clues", and he knows that already, so you really don't need to mention it again.