



Welcome Back!

Welcome back and happy new year! I hope all of you have had a wonderfully relaxing winter break, despite its unfortunately short duration. Put down the eggnog and pick up your pencils, because another semester is beginning and its once again time for the everyday college grind.

Another year under our belts means we are all one step closer towards graduation, towards freedom, towards the next chapter of our lives. I know everyone is eager to make new year's resolutions, looking forward to what's coming next, but I think it's also important to look back on everything and everyone that defined the past year for you. What (or who) were the highlights of your 2016? What memories will you be sharing with your grandkids? Who was there for your highs, and lifted you up from your lows? Remember these things and these people, maybe write them down, and keep them close to your heart, because it sure would be a shame if you forgot them.

But sometimes, 2016 was a year that seemed straight out of an Onion headline, and I can't say I'm not glad to see it go. It was a year that saw the passing of so many iconic, culturally defining celebrities, from Bowie to Prince to Fisher, the explosion of viral social media, one of the most divisive and vitriolic elections in history, and, most importantly, the breakup of Brangelina. In all seriousness, 2016 was a year where the highs were high and the lows were low, but hopefully, we can look forward to bigger and better things from human kind in 2017!

And as we move into the new year, ready with our shiny resolutions that we'll do our best to stick to, remember that its ok to fail! Failure is good! Learn from your mistakes and start again, rather than giving up. Move forward, don't be discouraged, and stay motivated! Of course, I realize this is much easier said than done, but even adopting that attitude is a step in the right direction. All the old sayings are true-learn to walk before you run, Rome wasn't built in a day, etc. etc. Baby steps are key!

Anyways, enough with these kinds of preachy ramblings that came right out of that self-help book your mom got you for Christmas (Subtle, mom!). Get out there and actually put it into action, and make something of this year. Good luck during this semester, I believe in you, have fun, and happy new year!

Stephanie Liu, *Newsletter Co-Editor*

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Warm Hands, Cold Heart?

by: Stephanie Liu, Newsletter Co-Editor

It's the start of a new calendar year, which means we have left behind the stress, exhaustion, and sleep deprivation of last semester and are gearing up to do it all over again in the next. Hopefully Pitt's luxuriously long winter break has left you feeling rejuvenated and ready to take on the semester! Although it's technically called the spring semester, winter only just arrived in mid December, and the warmth of spring is still seemingly light years away. Instead, in true winter-in-Pittsburgh fashion, recent weather has been the most disgusting combination of gray, wet, and bitterly cold.

For those of you unfortunate enough to need to brave these elements for long periods of time, whether it be for a job or maybe an event your student organization is hosting, you're probably already intimately aware of the wonder that is hand warmers. But have you ever wondered what exactly is happening in these magical bags of warming goodness?

Disposable hand warmers harness the power of the oxidation of iron (i.e. rust!), a rather exothermic process, as the source of their heat. By removing the small pouch from its plastic wrappings, you are exposing the iron contained in the porous cloth package to the oxygen in the atmosphere, immediately triggering the chemical reaction. This is helped by a catalyst, in this case, sodium chloride salt. This is also part of the reason why iron seems to degrade faster in the winter—all the salt used to de-ice roads acts as a catalyst and speeds up the corrosion of things like car undercarriages.

These hand warmers also contain a few other ingredients to prevent them from burning out too quickly or too hotly. Activated charcoal, which is relatively thermally conductive, works to evenly distribute the heat produced in the pack. Furthermore, it also contains the water that is needed for the oxidation of iron to proceed. Vermiculite, a hydrous phyllosilicate mineral, acts as an insulator. This prevents all the heat from escaping at once, which could burn you and significantly shorten the lifespan of these hand warmers. It's unique in that, when heated, vermiculite undergoes significant expansion. This contributes to its insulating qualities, which is why it is sometimes used as building insulation and spray-applied fireproofing.

Another commonly used type of hand warmer is the crystallization type. It consists of a supersaturated solution of sodium acetate, which is not particularly stable and very easily crystallizes. By snapping the metal disc contained within the hand warmer, you can trigger the formation of sodium acetate crystals, which is (obviously) an exothermic reaction. The best part—this type of hand warmer is reusable! Boiling the pack in water for a few minutes will re-dissolve the crystals in solution and “reset” your pack, ready to use the next time you have to suffer the outdoors.

It might seem like I don't like the winter, but quite the opposite is true. Ice skating, snowball fights, and skiing, among other things, are all great winter time activities, despite the freezing temperatures. Hopefully this article has taught you something about staying warm in that cold, and that your learning will continue throughout this semester. Best of luck as classes start, stay warm, and stick to all your resolutions!



Over the holiday break, you may have consumed an abundance of cookies, sweets, and exquisite baked goods. At the time, you were probably more focused on how delicious these treats were rather than what made them taste that way (like I was). However, as close companions of chemistry, I think we should take some time to appreciate the intricate complexities that were occurring right before our very own eyes (or in the comfort of the warm oven).

If you are also like me, you may be rolling your eyes right now at the very thought of understanding such concepts as they may ruin baking for you in the future. However, now that class is back up and running, it is time to think about your good, old, faithful friend once again.

Let's start off with something most of us are familiar with if baking is a common occurrence for you. Now, I do not mean turning to Betty Crocker, but instead homemade baking! The question I am sure you are all asking right now is why does baking powder or baking soda allow baked goods to rise? I am so glad you asked. But, before we dive in, let us establish the fact that if you run out of baking powder, you cannot substitute baking soda for it. But, thanks to chemistry, we can understand why this is and what to do about it in the future.



While both baking soda and baking powder are leavening agents that produce carbon dioxide to allow baked goods to rise, they are used under different circumstances. Baking soda is comprised of pure sodium bicarbonate. However, when the ingredient mixture (“system”, if you will), contains an acidic ingredient such as chocolate or buttermilk, the baking soda and acidic “reagent” allows for the production of carbon dioxide so that the baked goods rise. This is also why there is a sense of urgency when using baking soda – this chemical reaction happens quickly as soon as the ingredients are mixed.

On the other hand, baking powder contains other ingredients than sodium bicarbonate including the already present acidic reagent cream of tartar (potassium bitartrate) in addition to a drying reagent (typically starch). Baking powder includes two mechanisms of action. A single-acting baking powder is similar to baking soda because it is immediately active upon interaction with moisture. Thus, baking with a single-acting baking powder is extremely time sensitive. Double-acting baking powder undergoes two reactions, as you may have guessed from the name. First, as the powder is added to the dough at room temperature, gas is released. However, the second reaction produces the most gas when the dough is placed in the oven and the system's temperature greatly increases thanks to the oven surroundings!

In addition to chemical reactions, chemists like to also classify species based upon their acidity or basicity. Baking soda itself is basic and requires an acid such as buttermilk in order to not produce bitter tasting cookies. Baking powder is composed of both acidic and basic ingredients, so its taste is neutral. This is why other neutral substances are contained within a system involving baking powder such as milk.

If you were paying attention, you may have remembered the comment that you cannot substitute baking soda for baking powder. However, it is possible to substitute baking powder for baking soda. By itself, baking soda does not have the acidic reagents needed to make baked goods rise. But, baking powder can be made from baking soda and cream of tartar in a 1:2 ratio.

I don't know about you, but all this talk of baking is making me hungry...I must now go and check if I have all of the ingredients in my cabinet.

References:

1. Helmenstine, Anne Marie. What is the Difference Between Baking Soda and Baking Powder? About education.org., October 2016.
2. Helmenstine, Anne Marie. What is Cream of Tartar? About education.org. February 2016.



*The University of Pittsburgh
Department of Chemistry*

is proud to announce

*The McKeever Summer
Undergraduate
Research Fellowship*

- **T**he Undergraduate Research Fellowship will be awarded this Summer 2017.
- **T**his Fellowship will provide a Summer stipend of \$3,500.00 to the recipient for work carried out in the research lab of our faculty member.
- **P**lease submit a letter of recommendation from a Faculty Mentor which includes your qualifications and details of the planned research project (1-2 pages) and a **one** page personal statement of your future goals to **Dr. George C. Bandik in Room 107 Chevron Science Center by February 20, 2017**. All nominations will be reviewed by our Undergraduate Curriculum Committee and the recipient will be recognized at our Undergraduate Spring Term Awards Ceremony within the University of Pittsburgh, Department of Chemistry.

Deadline to receive all materials for this Fellowship is February 20, 2017.



The Department of Chemistry of the University of Pittsburgh and The Valspar Corporation

are pleased to announce

The Valspar Corporation Award in Chemistry

The Award will be made in Spring 2017 to one or more outstanding chemistry majors completing their sophomore or junior year. The award consists of a three month paid internship for Summer 2017 in the Valspar Laboratories in Pittsburgh, plus a \$2,000 scholarship to be used to attend the University of Pittsburgh during the student's junior or senior year.

Criteria for the award are as follows:

- a) The student must be a non pre-professional chemistry major at the University of Pittsburgh.
- b) The student must have a 3.0 or higher grade point average at the time of selection.
- c) Where applicable, financial need will be considered.

To apply for the award:

- 1) Complete and submit an application form (available in 107 Chevron Science Center).
- 2) Submit an unofficial transcript of all undergraduate work.
- 3) Arrange for a letter of reference (from a member of the University of Pittsburgh faculty) to be submitted.

Materials are to be submitted to:

Dr. George C. Bandik
107 Chevron Science Center
Department of Chemistry
University of Pittsburgh
Pittsburgh, PA 15260

**Deadline for all application materials is
January 26, 2017**

2017 January ACS-SA Schedule

13 Officer's Meeting

20 The Valspar Internship and
New Developments in Pittsburgh
Ben Webster, Valspar Corporation

27 Winter Holiday Party
Reservations REQUIRED



Hoagies and Sample Exams yet Again!

Our most visible activities are the ACS hoagie and Chemistry Exam sales. Just about everyone having a Chemistry Lab class in Chevron has at one time or another eaten an ACS hoagie from Uncle Sam's while studying. The funds raised by these sales help to defray the weekly meeting expenses for refreshments and other incidentals as well as the cost of the food and supplies at our social functions.



Hoagies are sold on Tuesdays throughout the semester.

I Need a Job!

It's that time of year! Time to begin the search for a summer position. There are several opportunities for summer opportunities available to Chemistry majors.

The first place to look is the Chem Major News area of the first floor hallway. Here you will find the current Research Experiences for Undergraduate (REU) listings. They are from all over the country.

You may also want to visit Career Services (2nd floor WPU).

Ms. Emily Bennett can help you with opportunities available through their Office.

Finally, don't forget the Arts and Sciences Office of Experiential Learning (B-4, Thaw Hall). Mr. Patrick Mullen can assist you there.

With all of these opportunities available, it should be an exciting and productive summer for everyone. Good Luck!



American Chemical Society

Student Affiliates, University of Pittsburgh

Membership Application

This is a powerful professional organization for the benefit of individuals interested in chemistry and related fields. Our organization offers exciting extracurricular activities and many outstanding opportunities for our members, including:

- 1 WEEKLY MEETINGS**-to plan activities, provide interesting speakers, discuss ideas, and keep students aware of what is happening in the scientific community.
- 2 ANNUAL TRIPS**-Each year we sponsor (a) trip(s), to external chemistry environments, as well as for social enjoyment. Significantly reduced rates are available to active members. In the past few years we have traveled to New Orleans, Atlanta and New York.
- 3 PROFESSIONAL NETWORKING**-Our organization has many opportunities to make contacts with professionals in both the scientific industry and academia. Student affiliates also have the opportunity to join the National ACS.
- 4 SOCIAL ACTIVITIES**-We sponsor many activities throughout the year just for fun.

Our meetings are held every Friday at 12:00 noon in Room 150 Chevron Science Center. To join, complete the application form below and come to one of our meetings. Our first meeting will be January 20, 2017 but you may join any time throughout the year.

Name:	_____
School Address:	_____ _____
Permanent Address:	_____ _____
School Phone:	_____ Home Phone: _____
Major:	_____ Year in School
	Fr. So. Jr. Sr.
E-mail:	_____
May we include your name, number and e-mail on the published phone list?	YES NO

To submit this form by mail, send it to ACS-SA, Box 24, Chevron Science Center, University of Pittsburgh, Department of Chemistry, Pittsburgh, PA 15260. Be sure to include the \$15.00 dues (make checks payable to the University of Pittsburgh). It is possible to be active even if you can not attend the meetings. For more information, see our display case in the lobby of Chevron Science Center.

