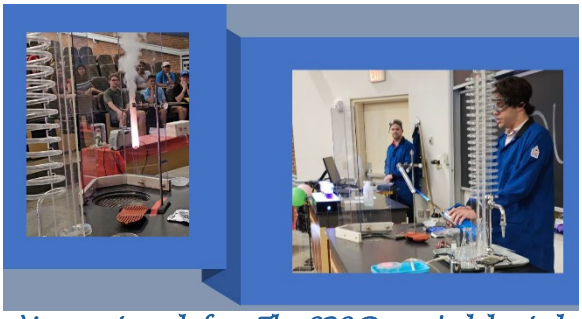
CBC Demo Lab Digest



More outreach fun: The CBC Demo Lab hosted show #1 of 2: Our friends from the Ohio Supercomputer Center-Summer Institute visited us for a 1-hr Long show full of Fun Demos! Above is Student Assistant, Sean, performing Combustion of Candy.

To order for Summer 2024, Please click here :)

or scan the QR Code:

Today is Friday, June 7th,
And these are the trendies demonstrations for the upcoming week!

We are currently re-organizing our lab and the chemicals are just as confused of their location as we are ... so while they are still (somewhere) on our shelves, order while you can!

Use the link (Password: hydrogen) to order as well as the full list of demos; as always, early orders are very appreciated!

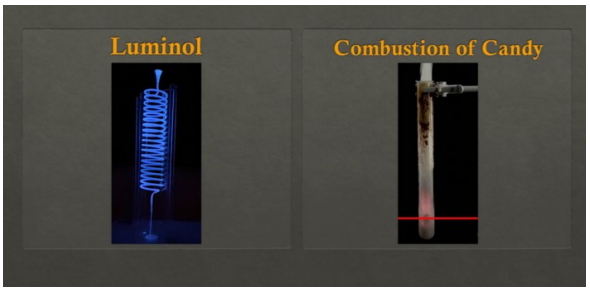
General Chemistry I

Weekly topics

- Thermochemistry
- Basic Concepts of Chemical Bonding
- Molecular Geometry and Bonding Theories

Thermochemistry

Thionine Reaction– Hold a solution of thionine and $FeSO_4$ in front of a bright light to show the reduction of thionine from a violet form to a colorless form; this is an endothermic reaction that absorbs light energy.

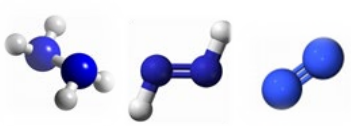


Luminol – Pour solutions of luminol and H_2O_2 into a tall glass spiral to produce a beautiful chemiluminescent reaction. The light-emitting species is the dicarboxylate ion, aminophthalate, the

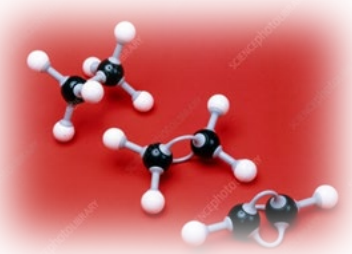
product of the oxidation of luminol with H_2O_2.

Combustion of Candy – Contrast the oxidation of sucrose in the body (by eating some candy) with the oxidation of sucrose by $KClO_3$ (as shown by dropping some candy into molten $KClO_3$, producing steam and a lavender flame. Body temperature is ~37°C, and the melting point of $KClO_3$ is 368°C.

Basic Concepts of Chemical Bonding

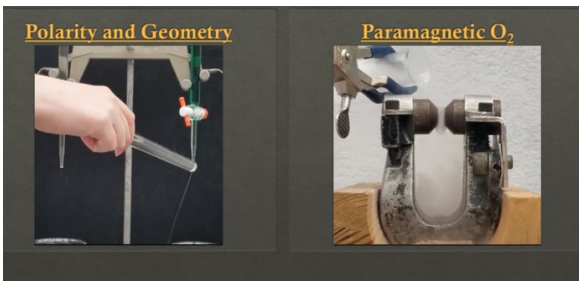


Contrast models of NH_2—NH_2, NH=NH, and N≡N to show the decreasing N–N bond length as the bond order increases



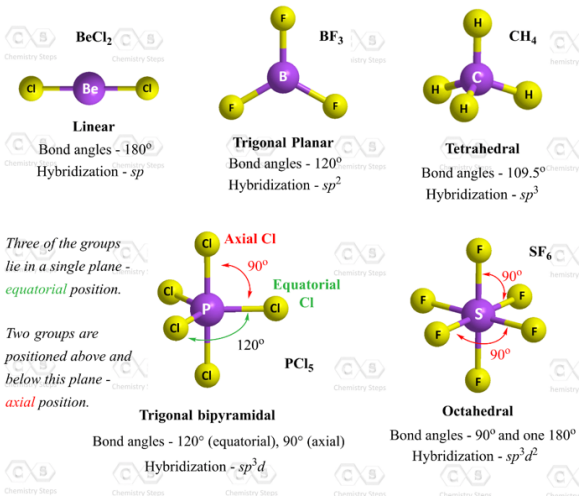
Show orbital overlap models of ethane, ethene, and ethyne (acetylene)

Molecular Geometry and Bonding Theories



Polarity and Geometry – Show the dependence of dipole-dipole forces on geometry by contrasting the effect of a charged rod on streams of H_2O and "CCl_4" (actually hexane) flowing from burets.

Paramagnetic O_2 – Demonstrate the paramagnetism of liquid oxygen by pouring first $N_2(\ell)$, then $O_2(\ell)$ between the poles of a powerful magnet on the overhead projector or document camera.



Use ball-and-stick models to illustrate the VSEPR shapes and sub-shapes. Normal order is for the parent shapes. You must specify if you want sub-shapes

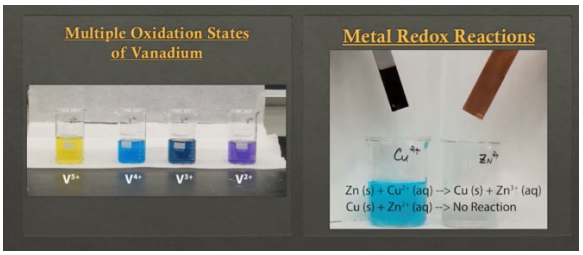
- Linear
- Trigonal Planar – trigonal planar and bent 120°
- Tetrahedral – tetrahedral, trigonal pyramidal, and bent 109
- Trigonal Bipyramidal – trigonal bipyramidal, see-saw, T-shaped
- Octahedral – octahedral, square pyramidal, square planar

General Chemistry II

Weekly topics

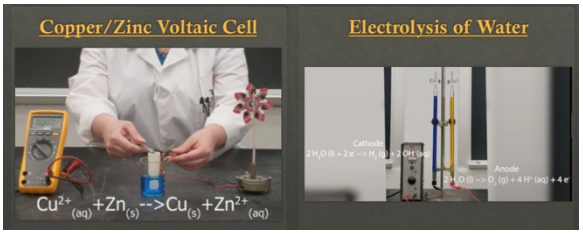
- Electrochemistry

Electrochemistry



Multiple Oxidation States of Vanadium – Shake a solution of ammonium meta-vanadate with a Zn-Hg amalgam to reduce the vanadium from +5 to +4 to +3 to +2 with different colors at each stage.

Metal Redox Reactions – Compare redox reactions between metals and metal ions to see which is spontaneous.



Copper/Zinc Voltaic Cell – Demonstrate a copper/zinc voltaic cell turning a motor to show that a spontaneous reaction can be harnessed to do work.

- Pass around a disassembled 9 V battery to show that it is comprised of six 1.5 V cells.

Electrolysis of Water – Electrolyze water (dilute Na_2SO_4 solution with indicator) in the Hoffman apparatus to decompose it into its component elements, hydrogen and oxygen. If desired, you can test the H_2 (g) and/or O_2 (g) produced with a flame and a glowing splint, respectively.

Have a great week!

-The Demo Lab

P.S. If you are ahead/behind of schedule, let us know so we can adjust the demos accordingly. Currently we are simply using the syllabi to guess where your respective classes are at. And here is the link again