Mississippi State University Student Members of the American Chemical Society

National Chemistry Week 2017

Outreach Events
SMACS organized a chemistry demonstration show during the tailgating festivities of our homecoming football game on October 21, 2017. Volunteers were trained on specific demonstrations (detailed below), and there was a kids’ table with hands-on activities and goodies. A total of four shows were performed, each before a large crowd. Many others watched as they walked by, or caught part of the show. It is estimated that over 3000 people were reached by our demonstration show. Many children were elated about the science and parents approached the volunteers after the shows to state how excited their children were about science.

**Demonstration Details**

**“Elephant toothpaste”** – This is a chemical reaction involving 30% hydrogen peroxide with a potassium iodide solution. A small mixture of these two solutions result in a rapid expansion of volume where a colorful foam is produced. The colorful foam is a harmless mixture of water and dish soap, as the hydrogen peroxide decomposes to water and oxygen.

**“Make a Cloud”** – This demonstration shows the phase change of a liquid to a gas. A small amount of liquid nitrogen (less than 2 liters) is poured into a 32-gallon trash bin. Shortly thereafter, hot water is quickly poured into the bin, dramatically speeding up the liquid-to-gas phase transition of the liquid nitrogen. This phase change condenses some of the water which results in a large white cloud of water vapor that comes out of the bin up into the air (completely non-toxic). The waste of reaction is simply water as all of the N₂ will evaporate into atmosphere as a harmless gas. This simple reaction was a crowd favorite!
“SuperCool N\textsubscript{2}” – Gaseous dinitrogen (N\textsubscript{2}) makes up approximately 80% of the air that we breathe. Liquid nitrogen (liquid N\textsubscript{2}) boils –321 °F. Using small volumes of liquid nitrogen (less than one liter), this demonstration illustrates the cold nature of liquid nitrogen by showing the effects of freezing ordinary items (rubber hosing, a flower, a banana, etc.) in a short amount of time. Items that may be delicate or flexible when at room temperature become brittle when cooled to low temperature by liquid nitrogen. Subsequently, the objects can be dropped or are smashed with a hammer.

“Shrinking Balloons” – This demonstration again used liquid nitrogen to illustrate the effect of temperature on the space between molecules in gases. Balloons filled with hydrogen are stuffed into the nitrogen dewar, and as the gas inside the balloon is cooled, the balloon shrinks. This causes a funny “endless” effect, where approximately 6 balloons can be stuffed into a small container. After removing the balloons (with tongs and gloves), the balloons expand—the helium balloon will rise.

“Coke & Mentos” – This is probably the most familiar demonstration as it was made popular on YouTube more than a decade ago. A reaction of Diet CokeTM with MentosTM is triggered by dropping a stack of the candy into the soda. The soda rapidly creating a geyser effect. This was very popular among the kids, who stuck their tongues out to catch some of the soda raining down!

“Dissolving Styrofoam” – This demonstration highlights the reactivity of certain chemicals including diethyl ether and acetone. A Styrofoam cup will be subjected to a few drops of these two solvents and it will dissolve. Styrofoam is a trademarked brand of closed-cell extruded polystyrene foam. The solvent chemicals quickly evaporate, leaving behind the original, but deformed, Styrofoam. It creates a “disappearing” effect as the Styrofoam cup dissolves.

Interactive Demonstration (Kids’ Table) Details

“Slime” – This hands-on activity illustrates the process of polymerization and the physical properties of polymers. This activity is commonly performed by, young children. The polymer is created by mixing Borax, Elmer’s™ glue, and water in a bowl. Food coloring and glitter can be added for artistic effect. This activity is featured on the ACS website:
“Bouncy Balls” – This hands-on activity requires mixing water, borax, glue, cornstarch, and food coloring. The mixture will immediately begin to harden as it is shaped into a ball by hand. This experiment is highlighted on the ACS website (page 6 of the following PDF: https://www.acs.org/content/dam/acsorg/education/outreach/2008-ncw-fall-edition-having-a-ball-with-chemistry.pdf).

Event Photos