Get Wet Project Report

Sung Moon (with help of Young Kim and Seunghwa Park) | MCEN 4151 | 2018-02-19

In our first image assignment, Get Wet project, the purpose was to get our feet wet to take a picture of fluids of our choice that clearly exhibits both aesthetics and phenomena that is being experimented. The Get Wet project allowed the students to perform their artistically developed interests and physics knowledges. For my project, my friends and I came together to think of cool fluid tricks to perform and found out about a Lava Lamp Experiment. As a novice to the photographic field, my goal in this project was just to have a picture that vividly demonstrates what I am intending to demonstrate with some color aesthetic follow ups. With the image itself, its intent was to explicitly illustrate the density phenomena occurring among water, oil, and food coloring and effervescent tablets dissolution phenomena. Young Kim helped with the lighting at the bottom of the cup and Seunghwa Park helped me with dropping tablet while I was taking the picture.

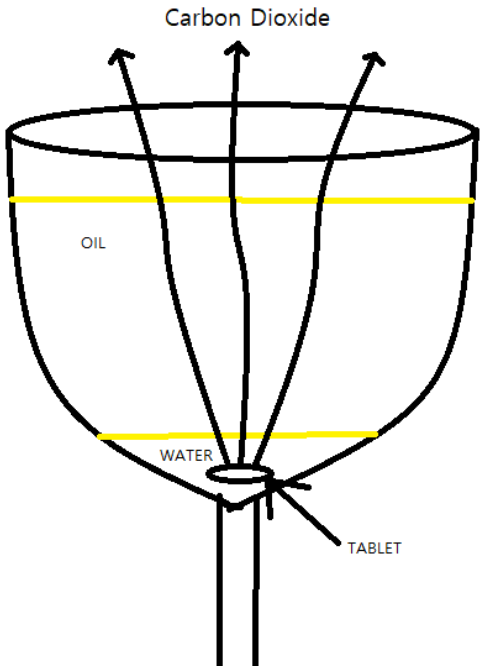

Figure 1: Sketch of my image

As one can see in the Figure 1, the vegetable oil and water did not mix together since their molecule structure are very opposite. They can't formulate any chemical bonds with each other. The water molecule has two hydrogen with one oxygen and has a V shape. One oxygen at the bottom of the molecule with two hydrogen atoms on each

ends of the two tops. The hydrogen and oxygen atoms share unequal amount of electrons, and as a result, the molecule bottom has a negative charge and top has positive charge. This makes the water a polar molecule. In comparison, the vegetable oil is nonpolar made up of long hydrocarbons chains, carbon and hydrogen atoms bonded in strings. These carbon and hydrogen atoms in vegetable oil molecule share equal amount of electrons, and as result, its molecules do not have all the positive charges at one side and negative charges at the other because the charges are not getting broken up. However, food coloring can be mixed with water because it is also a polar molecule. Overall, the droplets of food coloring dropped into the oil, without dissolving, sinks into the water and finally dissolves in water. The effervescent tablet also sinks into the water, chemical reaction occurs, and creates bubbles to carry up the food colored water onto the surface of oil. In order to comprehend the solution formation, understanding the thermodynamic in the procedure is crucial. From the equation for free energy, $\Delta G_{soln} = \Delta H_{soln} - T\Delta S_{soln}$, the solution will occur when the change in Gsoln is negative. In the case of endothermic solution formation, the solution will from when –TdeltaSsoln is greater than the change in Hsoln.

First of all, I poured the water and oil into the same cup. Then, I added some droplets of food dyes. Last but not least, Seunghwa helped me adding effervescent tablet to create bubbles that made the image more grandiose. To visualize better flow for my image, I used many lightings. I used two lightings at the bottom of the cup and used flash as I was taking the picture. Also, I used food dye bought from the Safeway to more colorfully visualize the carbon dioxide bubbles.

From the original image, I really could not see the full flow. What I decide to do was to crop the image only to the fluids and save as png file in Photoshop. I thought exhibiting full wine cup was very useless and distractive to the audience. As a novice, I didn’t have any lavish or intricate camera to film my flow, so I used my phone camera to do its job. From the feedback from the class, I also think that lighting is somewhat distractive to my purpose of the image. I’ve fulfilled my intent, but I should’ve have done better job with the distractive lights.

Citation

Aslani, A., & Jahangiri, H. (2013, December). Formulation, Characterization and Physicochemical Evaluation of Ranitidine Effervescent Tablets. Retrieved February 20, 2018, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3848210/