Team project 2

## Dry ice jumps into the water and makes bubbles

Flow Visualization

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The purpose of this image for team project 2 is to put dry ice into the water that then produces bubbles. Dry ice is frozen Carbon dioxide that is different from most solids. It can not be melted to form liquid, but it can be made to change into a gas at atmospheric pressure. This process is called sublimation. The Carbon dioxide pressure-temperature phase diagram is shown as Figure 1[1]. Dry Ice is useful for freezing, and keeping things frozen because of its very cold temperature that is around -78.5 ℃ (-109.3 ℉). More recently, dry ice is not only used for keeping items at low temperatures, but is also widely applied for industrial cleaning [2].
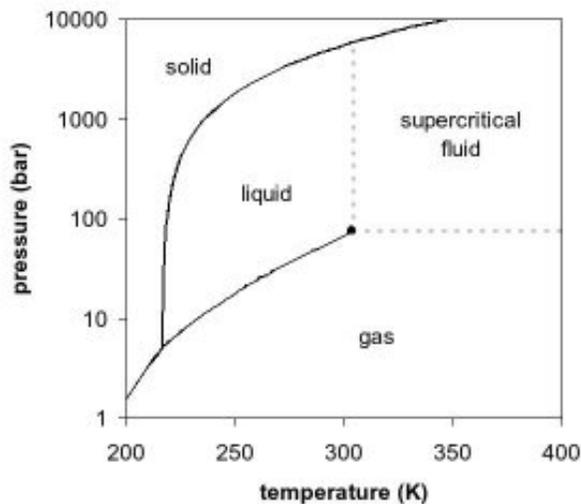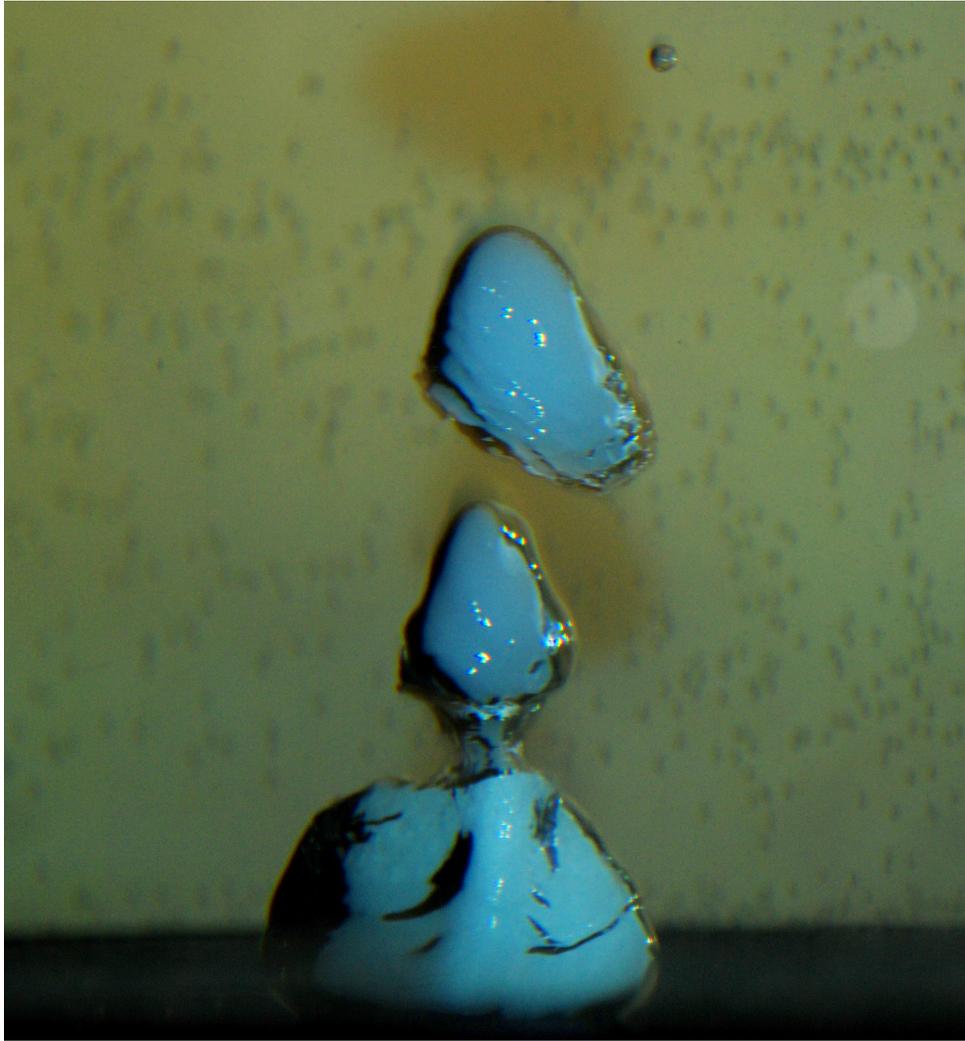
Experiment setup

My ideal image for team project 2 is to capture the moment of rising bubbles in water. We prepare some equipment which consists of a fish tank, food coloring, and dry ice. Basically, the most important issue is how to setup the light source. We setup the light source from the back side of the fish tank, preventing the shadow and reflection in our picture, thanks to two teammates who both two are Fine art students. Another problem concerns the small bubbles on the glass surface of the fish tank that might affect our image quality. I am very happy to capture this good image. It not only includes the rising bubble but also shows the surface of the dry ice where the phase change from solid to gas occurs.

Conclusion

This image presents dry ice producing bubbles in water. The dry ice stayed at the bottom of the tank and produced bubbles quickly. Capturing bubbles is not an easy task because the speed of the rising bubble is almost too fast to take. Therefore, we have to increase shutter speed to completely capture the image of the rising bubbles. Another problem is that the increased shutter speed requires a strong light source. Although I can increase the shutter speed, we don't have enough light to capture a perfect image. It seems a little difficult for the setup of the camera and experiment equipment. After I took my image for the rising bubble, I found that the lighting in my picture was not strong enough. I had to adjust the contrast with PhotoShop, increasing the light to make picture sharper. Overall, I am happy to capture the image of the bubbles by dry ice in the water, to do experiment with my teammates together, and to get a beautiful image for the team project 2.

Camera information

Mark: Nikon
Model: Nikon D80
Lens: Nikon 24-135mm
Shutter speed: 1/200 sec
F-Stop: f/5.6
ISO: 200
Focal length: 125 mm
Pixel Dimension: X: 2416; Y: 2592
Flash: No

References

[1]. Carbon_dioxide_pressure-temperature_phase_diagram
http://en.wikipedia.org/wiki/Dry_ice

[2]. Dry-ice blasting for cleaning: process, optimization and application,**G. Spur, E. Uhlmann and F. Elbing** , Institute for Machine Tools and Factory Management, Technical University Berlin, Pascalstr. 8-9, 10587 Berlin, Germany.