Team First Image Report

Lucas Garcia

Team Members:: Brian Gomez, Brooke Shade, Abby Rinerson and Nicholas Scott

CINE 4200

10/14/19

For our Team First Project we decided that we wanted to capture and observe the effect that burning different metal ions could have on a flame. When certain metals are heated and burned, they will release a different light spectrum based off the specific chemical properties. For my specific flame I tested out how the combination of mixing hand sanitizer and basic table salt to produce a yellow flame. I really wanted to showcase the color of the flame and in the process, I created and captured a flow of the flame which is truly unique and eye catching.

To photograph our color changing flames we had to take the correct precautionary measures and agreed to meet up in the ITLL to use the fume hood. This made things a little tricky as there is a protective glass between you and the flame which made pictures a little blurry at first. We ultimately agreed to remove the protective glass, and this allowed us to take much more clear pictures. The down part to this however was it made the space a lot more crammed for 5 20-year old's and their cameras. We spent about 2 hours in the fume hood taking pictures and burning different metals. We made sure that the ventilation was on and that we were being safe with the way we disposed of our chemicals prior to the experiment. Ultimately, we all got the photos we wanted and saw many different color flames across the board. For my photo I mixed table salt and hand sanitizer in a muffin tin with molds that had a diameter of 2.5 inches (Fig 1.). From there we lit the mixture on fire with a basic butane filled lighter. We propped the muffin

Figure 1: Set Up

tin up to make the vantage point a little easier for all of us. We also had a cooking tin which we used to take pictures as well.

For my whole life I thought the color of the flame attributed to the temperature of the flame itself but after this group project this has been dispelled for me and I have seen how chemical make up of different metals is what actually attributes to the color of the flame. When these compounds were burned their electrons jumped around into different energy levels causing them to produce different photons, based off their original position, with distinct wavelengths effecting the visible color. Each element has a certain number of electrons and energy levels so each one will have a different reaction when excited (heated). This is why my partners have a different color flame even though they also used hand sanitizer, the compound which they mixed is different producing a completely different color. Based off the color of my flame one can infer that I have burned sodium chloride which is what table salt is. Sodium chloride produces this thick yellow color meaning it has a wavelength of between 590-560 nm (Fig 2.)

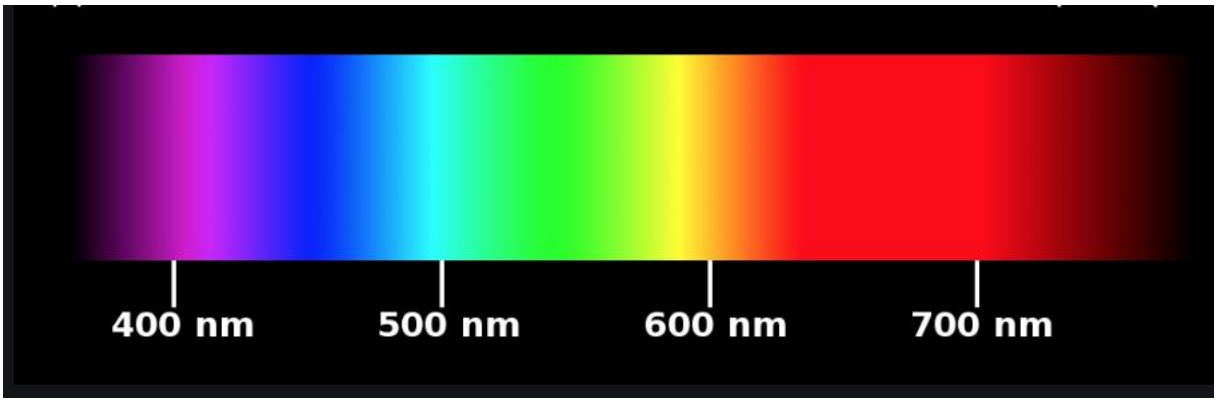

Figure 2: Visible Light Spectrum

To get the best capture of this flow possible we made the room as dark as possible and allowed for the light of the flame to be our source of light. This can be seen clearly in my photo as the whole muffin tin is dark except for the part in the front illuminated by the flame itself. I tried taking this picture at many different angles to solely try and capture the flame allowing it to pop off the black background. We used basic Walgreens brand hand sanitizer found in the ITLL and then we also used basic table salt from King Soopers.

I took this picture using a Canon Rebel T7i. The dimensions of the photo are 6000x4000 pixels. For this image I used an ISO of 1600, an fstop of f/5.6 and had a shutter speed of $1/400^{th}$ of a second. It was very interesting taking pictures of these flames because each flame is unique and produces a different wavelength of light. With this we had to adjust our camera settings for each color to get image to appear. I used these setting to capture the yellow light at low lighting. I manually focused the camera with a focal length of 45 mm to get the rim of the muffin tin.

I really enjoy how this image has a very fluid like dynamic to it, It seems like it has a laminar flow. To me it resembled a dinosaur with its distinct edges and smooth flow. At first, I took this picture for the color of the flame but ended up choosing my image based off the flame itself. The physics of the flow was captured well however, not the way we had planned. Originally, we had planned to make a rainbow flame but some of the chemicals we bought weren't potent enough with the material to produce the color we were seeking. In this image I

barely used any post processing because I wanted to keep the integrity of the flame. If given another chance I would try to create this rainbow flame.

Figure 3: Original/Unedited Photo