Dawood Ahmad // Get Wet Report

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MCEN 4151 - 001

Collaborators: Faisal Alismail

Introduction

        The intent of this image was to create and capture a face using the laminar flame phenomena. Using a curved piece of cotton and igniting it, a temperature color gradient will be observed. It was intended to utilize this temperature color gradient to create the features of a face, the eyes, for example. And the curved piece of cotton would act as the mouth. The downside of using cotton as the fuel source is that the combustion happens very fast and therefore, difficult to capture. So, having another person is helpful. Faisal, helped me by igniting the cotton as I was getting ready to take the picture.

Setup

        To achieve the photo I utilized my fireplace as a safe and controlled environment for my combustion experiment. Using my phone's camera. I managed to tape my phone to the edge of the fireplace and place the cotton a distance 4cm away from it (Figure1). The reason for the 4cm distance is to achieve the best focus. Using a ruler and manual focus I managed to determine the best point for the cotton, and a mark was made at that point. The piece of cotton was about 2cm in width. The room in which the fire place is was fairly dark.
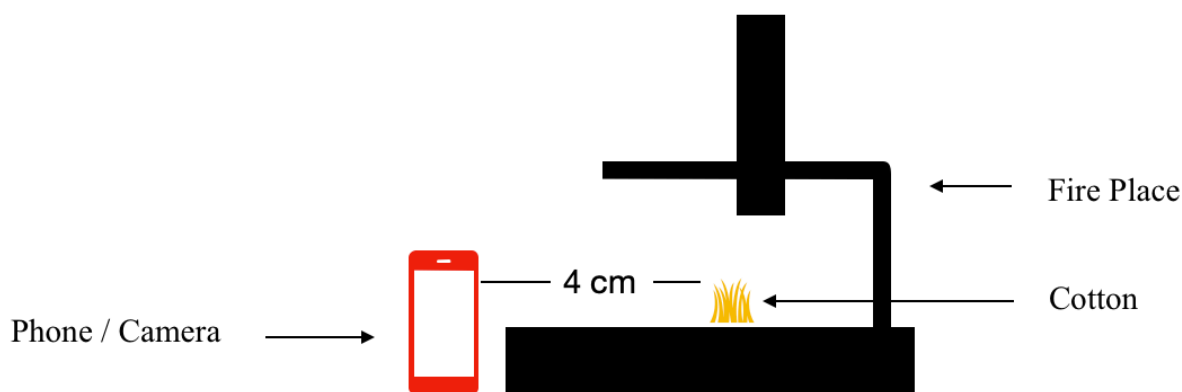
Figure 1.Side view of the setup

Flow Science

        The phenomena that I captured was a flame. A flame is the result of an exothermic reaction between a fuel source and an oxidizer. The fuel source for my image was the piece of cotton and the oxidizer was the oxygen present in atmospheric air. The different colors in a flame are due to the different temperatures throughout the path of the reaction. Where the coldest part corresponds to the color red and hottest part corresponding to the color white. The reason for the color white is that multiple

camera settings

  The camera used was a Samsung galaxy s9 smart phone with pixel size of 4032x3024. The focal length was 4.30mm, exposure time was 1/30s. The reason for this exposure time is that the flame was the light source and I wanted to capture the flame with a dark background behind it. I managed to achieve this by using this exposure time and an ISO of 250. Also aperture was F1.5

Edited photo

Figure 2.Image on the left is original photo. Image on the right is edited

For the editing, I changed the contrast and adjusted the shadows just to make the background look more dark. I was careful not to change the colors much because the color of the flame is very important for the scientific part of the experiment. I also cropped the image

conclusion

  The image does indeed show a smiling face using the different colors produced from the flames and the curved piece of cotton. What I like is how the image face gives a halloween feel. I wish I could have done a better job at making the fireplace more isolated. because as seen in the image there is a slight draft that caused the flame to go to the right.