Team First Report

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Flow Visualization 4151-4200-001

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The video used for this assignment depicts the phenomena of reigniting a candle via its smoke when blown out. This can happen when a lit candle in blown out, then a lighter is quickly brought to the smoke coming from the wick. The reason this can happen is because when the candle is lit, the flame/wick is burning up wax to produce the flame. When it is blown out, unburned wax is carried into the air with the smoke. This wax can be ignited and travel down the stream of smoke to reignite the wick itself. When making this video, just a candle and a long lighter was needed.

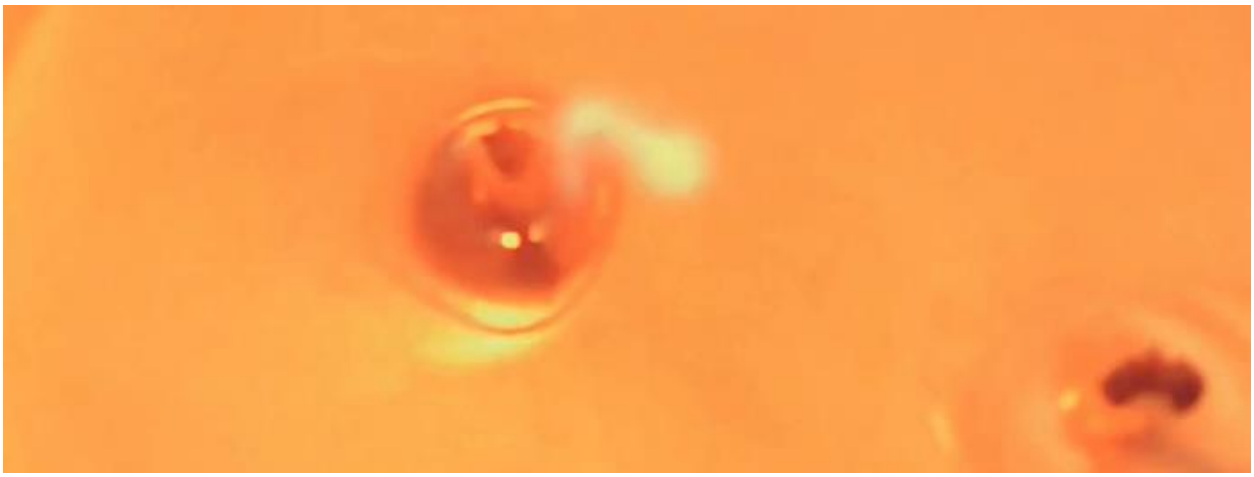

Figure 1: Flame Traveling Down Smoke

In the video, it is very easy to observe the multiple flames travel down the smoke to reignite the candle. The video was taken in a controlled environment to reduce any kind of air flow that would dissipate the smoke. Any normal candle that can be bought at stores can be used to replicate this experiment. I used a standard candle lighting lighter for its ease of use and control rather than matches. When the smoke is lit, it travels downwards because it is consuming its fuel, and the closer to the wick, the more unburned wax there will be because the smoke has not yet carried it away.

The video was taken on an iPhone 7 camera at 1080p with 120 frames per second. It was edited using iMovie and Shotcut. The color was brought out a little to help bring the focus on the reigniting flame. Because of the 120 frames per second, I was able to slow the video down enough to observe the flame traveling. It happens very quickly, but it is able to be seen.

Figure 2: Reignited Flame

The final video results in a slow-motion capture of this incredible phenomena in which a flame can be reignited through its smoke. The smoke couldn't keep a steady stream so it would dissipate quickly. This resulted in needing to keep the lighter fairly close to the wick. If I did this again, I would use a candle that wasn't in such a deep container to allow for better video capture.

Source:

http://www.iflscience.com/chemistry/relight-candle-its-smoke-trail/

https://www.thoughtco.com/traveling-flame-science-trick-607505