Combustion Carbon Capture via Aqueous Solutions

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The purpose of this experiment was to determine if carbon dioxide (CO2) from combustion emissions could be effectively removed using post-combustion water absorption. Combustions sources across industry (e.g. boilers and furnaces) represent a significant contributor of carbon dioxide to greenhouse gases. If absorbing the CO2 by conventional means at the point of generation is successful, then a potential cost-effective solution of preventing the CO2 from reaching the atmosphere is possible. The research hypothesis states that carbon dioxide emissions are reduced by using post-combustion water absorption. To conduct this experiment, a small-scale combustion apparatus was designed and fabricated. Trials were then conducted using the apparatus to test various water baths of tap water, distilled water, and LSU Lakes algae water. CO2 concentrations at key points within the apparatus were measured every 15 seconds for multiple 10-minute trails. The data set was analyzed based on the CO2 difference before and after the water bath. From this experiment, one can statistically conclude that the solutions with combustion were able to remove more CO2 than the solutions without combustion. Overall combustion CO2 removal rates were approximately 14%. The LSU Lake algae water was shown to remove the most CO2 at ~16%. In conclusion, the statistically significant experimental data results in rejecting the null hypothesis.