

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 trials. 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.