A Novel Approach to Solar Desalination Using Nanopaticles

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The purpose of the project was to determine if adding carbon nanoparticles to a salt water solution exposed to sunlight would cause steam to emerge from the water without it boiling and produce steam more efficiently than salt water alone. The null hypothesis was that there would be no significant difference between the amount of steam produced by the solutions with or without nanoparticles. The alternate hypothesis was that a significant difference in the change of volume, or steam produced, would be observed between the solutions with and without nanoparticles. The hypotheses were tested by first creating a dispersed nanofluid of the carbon nanoparticles of 1, 3, 5, 7, and 9% volume fractions in salt water, and a solution of salt water alone as a control. The solutions were then exposed to focused sunlight for a period of ten minutes and the change in temperature and volume were recorded. Each solution of nanoparticles was able to produce steam when exposed to sunlight without boiling, but the control solution was not. The average changes in volume for the 1, 3, 5, 7, and 9% solutions were 1.7, 2.0, 2.6, 4.1, and 4.7mL respectively, and the control had an average change of 0.1mL. T tests and other forms of statistical analysis were done and these differences between the test groups and control groups were found to be significant. The data therefore supported the alternate hypothesis and refuted the null hypothesis, meaning the alternate hypothesis was the most likely explanation for the phenomena observed during experimentation.

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