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*Soak Up the Sun: Using Nanoparticles to Catalyze Water Vaporization*

The Sun is the largest energy source in our solar system. Solar panels use the Sun to create electricity, and plants use the Sun to grow. This source of energy will last for billions of years, so why not harness it? Recently, light-absorbing nanoparticles were shown to be able to utilize the Sun's energy when dispersed in water to generate steam. This experiment raises other questions such as: Under what conditions do the nanoparticles produce the most steam? My current experiment tested this question by evaluating three variables: the depth in which light was focused, the type of nanoparticle, and the concentration of nanoparticles. Carbon Black nanoparticles were used and light was focused using a lens on 30 ml of water. It became evident that focusing light on the top generated the most steam. Next, the type of nanoparticle was varied. Gold nanoparticles were tested to see their effect on steam generation compared to carbon black nanoparticles. Although gold nanoparticles did generate steam, Carbon Black nanoparticles emerged as the better of the two types tested. Different concentrations of Carbon Black nanoparticles were tested. In this test, 4 mg of nanoparticles in 30 ml of water generated the most steam compared to other concentrations tested (1, 2, or 6 mg). In conclusion, when light was focused on the top of a solution of 4 mg of Carbon Black nanoparticles in 30 ml of water, the most steam was produced. Thus, the ability of nanoparticles to produce steam was demonstrated.