Effects of Polarized Light on Solar Cell Yield

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Solar panels use the energy in light to free electrons create potential difference, creating a flow of electrons (current) and electromotive force (EMF, or voltage). Because electromagnetic waves such as light consist of two perpendicular transverse waves, they can be filtered so that only one of these waves is allowed to continue to propagate. If we create EMF in a solar cell, how will the voltage produced vary between raw light and polarized light? Our experiment tested this, comparing voltages produced by solar panels using polarized and raw light in different conditions. Interestingly, we realized from our data that although the polarizing filter blocks half of the light, the differences in voltage were nearer to 3%. Through the course of our analysis, we concluded that the polarization of the light itself had no effect on the voltage yield, and that the difference in voltage is due instead to the decrease in light intensity (shade) caused by the filter. In an expansion of our initial research project, we tested the effects of polarized light on current as well as voltage. We found that current, rather than voltage, is directly proportional to light intensity (which is directly affected by polarization), and therefore significantly decreased by polarizing light.

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