NOVEL SOLAR CELLPHONES

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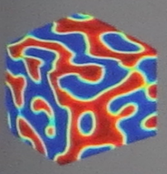
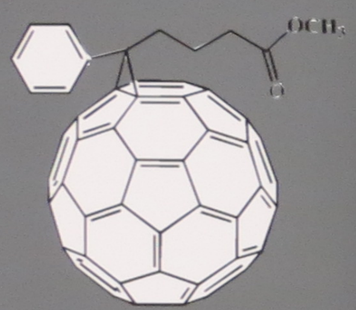
BACKGROUND OF ORGANIC SOLAR CELLS

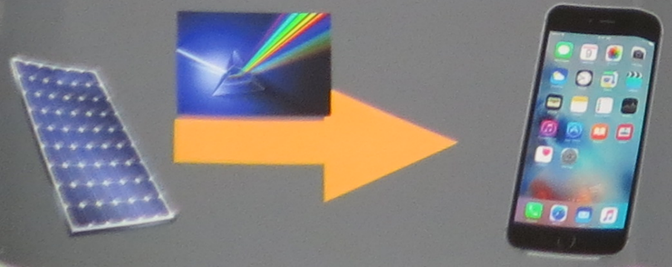
Organic Solar Cells (OSC) have received a lot of attention because of their superior properties compared to silicon solar cells.

They are significantly lighter, more flexible, scalable, will be cheaper in the future, have the ability to be molded into any any shape, and have the ability to fine tune the light properties to adapt to varying light conditions.





The first efficient thin-film organic solar cell was fabricated by C. Tang in 1985,[1] and achieved an efficiency of 0.95%. However, they have been continually improved by the introduction of functional layers that transport the exciton charges more efficiently and current OSC achieve nearly 15% efficiency.[2] The beneficial features of OSC have seldom been realized in my devices. One potential application of OSC is to integrate them into portable smartphones and design them to continuously charge them using indoor light. This approach will give you access to an unlimited power source and let you charge wherever and whenever.



GOAL

To develop an Organic Heterojunction Solar Cell that integrates into cell phones and provides continuous charging with indoor light

OBJECTIVE

1. To synthesize Organic Heterojunction Solar Cell and evaluate their power generation properties
2. To study the integration of Organic Heterojunction Solar Cell with a customized lithium battery in order to find optimal systems for the continuous charging requirements
3. To develop a 3D printing prototype of a self-charging phone case and evaluate the continuous phone charging properties with indoor light.

SIGNIFICANCE

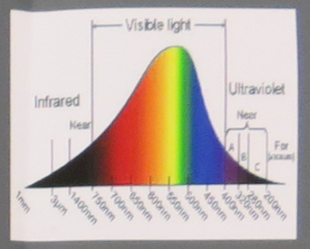
Why do we need to charge our phones? It's the twentieth century and human beings are chained to a wall charging their cell phones. It's such a foreign concept in a world full of technology. Our device gives you the answer, slip your cell phone into the case and have you phone charge due to the solar panel recycling wasted light.

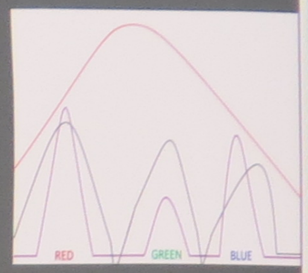
Approach

We want to give consumers the ability to help the environment and recycle wasted light by using it to charge our cell phone. In the coming weeks we plan on developing a heterojunction solar cell (Plastic Solar Cell). We want to use a heterojunction solar cell because it's organic and cheaper than a solar cell made up of silicon crystal. We want to integrate the organic solar cell into a 3D printed cell phone case that will rest on the cell phone. The cell will absorb light and charge the consumer's cell phone.

Method

OSC are being formed by mixing organic electron donors and acceptors[3], namely PCBM and polythiophene. This method creates more efficient substances that can obtain a broader amount of energy through the Electromagnetic Spectrum (Radio - UV), and is currently the most promising advance in solar technology. Studies show a 8.13% solar conservation as of 2010[4] with bulk heterojunction continuing to grow. Applications for this technology are continuing to grow.





[1] Tang, C.W Two-layer Organic Photovoltaic Cell Phys.lett 1985

[2] Pfützner, S.; Meiss, J.; Petrich, A.; Riede, M.; Leo, K.Thick C60:ZnPc Bulk Heterojunction Solar Cells with Improved Performance by Film Deposition on Heated Substrates Appl. Phys. Lett. 2009, 94, 253303

[3] Yu, G.; Gao, J.; Hummelen, J. C.; Wudl, F.; Heeger, A. J. Science 1995, 270, 1789

[4] http://www.pv-tech.org/

Graded Absorption Layers in Bulk Heterojunction Organic Solar Cells
Beatrice Beyer, Richard Pfeifer, Johannes K. Zettler, Olaf R. Hild, and Karl Leo
The Journal of Physical Chemistry C 2013 117 (19), 9537-9542
DOI: 10.1021/jp3109732

Hybrid Heterojunction Nanorods for Nanoscale Controlled Morphology in Bulk Heterojunction Solar Cells
Jose Mawyin, Ivan Shupyk, Mingqing Wang, Guillaume Poize, Pedro Atienzar, Thilini Ishwara, James R. Durrant, Jenny Nelson, Daiki Kanehira, Noriyuki Yoshimoto, Cyril Martini, Ekaterina Shilova, Patrick Secondo, Hugues Brisset, Frederic Fages, and Jörg Ackermann
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DOI: 10.1021/jp112369t

This project is sponsored by National Science Foundation, No. DRL-1322600