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Adaptive Dye-Sensitized Solar Cell

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Introduction

An adaptive dye-sensitized solar cell is basically a form of artificial photosynthesis that mimics the way a leaf converts sunlight into energy for growth. A dye sensitized solar cell converts sunlight in useful electricity while being adaptive to our everyday environment. This research focused on finding a cost effective and efficient way to print and adapt solar cells into electronics, common plastics and wood materials without compromising cost or efficiency.

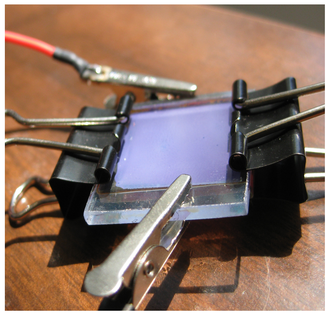


Figure 2:

Prepared Dye sensitized solar cell With glass substrate.

Methods

Replaced costly materials with alternatives:

(a) ITO electrode was replaced with carbon clothe which offered flexibility, low electric resistance and high conductivity.
(b) Glass substrate was replaced with pouch laminating plastic with benefits of protection a flexible substrate and UV protection.
(c) Inorganic dye was replaced with organic dye and anthocyanin, taken from grapes and fruit.

Results

(a) Voltages of 0.133, 0.093 and 0.094 millivolt were achieved when replaced with a carbon structure.
(b) Flexible Dye-Sensitized Solar Cell was able to be bent and twisted with the use of glass substrate and polymer.
(c) The use of plastic as a UV shield give the cell a long lasting result.
(d) Materials used could be replicated for mass adoption because of the low cost to acquire these materials, making the overall cell affordable.

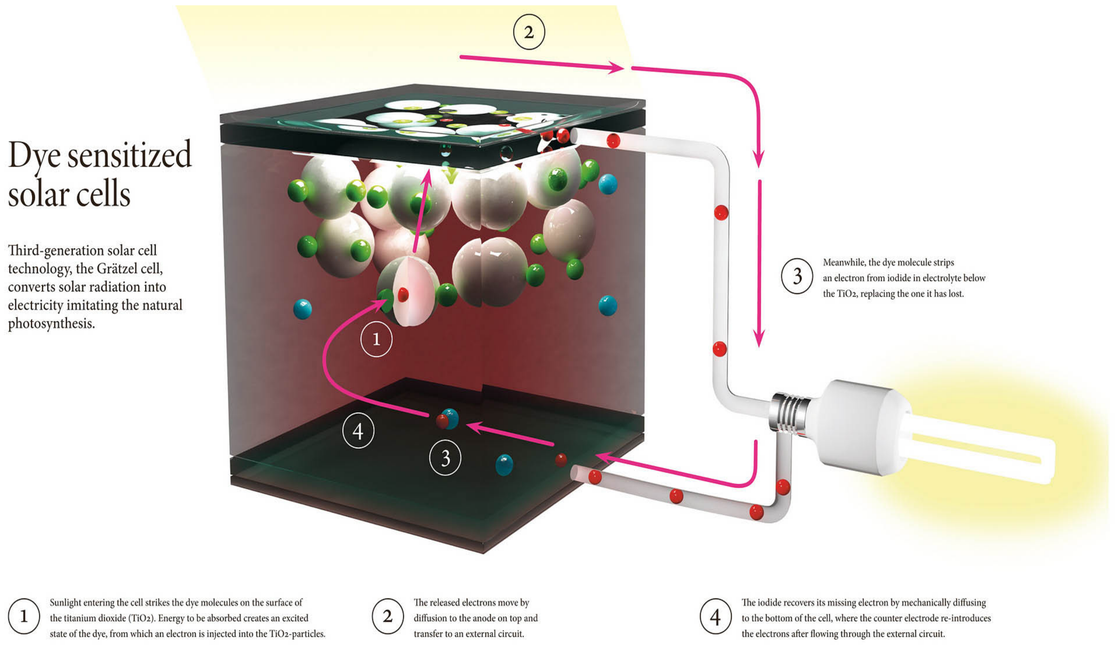
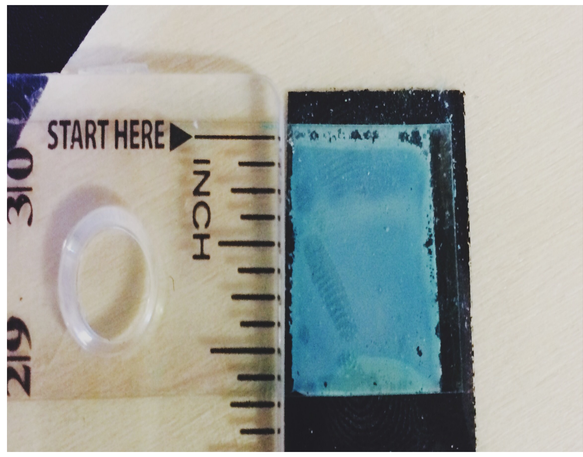


Figure 1: Dye sensitized solar cell structure.

Figure 2: Dye-Solar cell layered on carbon



Conclusions

As progress is made more research is needed to solve some of the problems facing Dye-Sensitized solar cell in theses areas:

(a) Cell electrolyte for charge transport.
(b) Suitable manufacturing technique.
(c) Replacing rare earth element used e.g platinum catalyst with organic element.

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