

COST EFFECTIVE SOLAR POWER GENERATION

Luminescent solar concentrators

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More energy from the sun falls on the earth in one hour than is used by the entire world's population in one year. Yet only 0.5 % of our power generation is currently met using solar power. Why is this, and how can we improve it?



Harvesting the energy



Current solar power generation mainly uses silicon photovoltaic (PV) cells to convert the incident solar energy into electrical energy, with an efficiency of around 20 %.

Downsides of PV cells

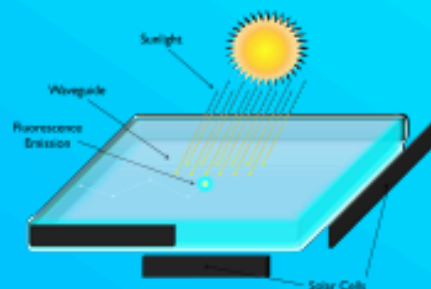
Efficient PV cells are expensive to produce, with the cell accounting for up to 70 % of the cost of a solar module.



PV cells work best in direct sunlight - as the sun moves in the sky the power output decreases unless you have expensive tracking devices.

Reducing the generation cost

A luminescent solar concentrator (LSC) is a device which absorbs sunlight over a large area of material, and then directs the energy, through luminescence, to PV cells mounted on the edges. Typically a LSC consists of a glass waveguide with luminescent species either embedded in the glass matrix, or as a thin polymer film coating.



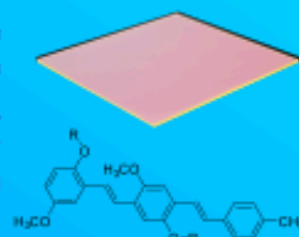
Benefits of LSCs

- The cost of solar energy conversion is decreased due to the reduced number of PV cells required.
- Due to the light guiding nature, LSCs are more efficient than PV cells in indirect sunlight.



Our Approach

We are investigating a number of luminescent organic molecules, of the type shown. The ideal molecule has high luminescence efficiency and no overlap of the absorption and emission spectra.



Market opportunity

Building integrated LSC modules has been identified as the prime market opportunity. Here the LSC can work in conjunction with PV cells, with the more efficient PV cells having prime rooftop positioning, and the LSCs



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