Kupcinet-Getz Summer School Project

Optimising Polymer Layer for use in Schottky-type silicon solar cells

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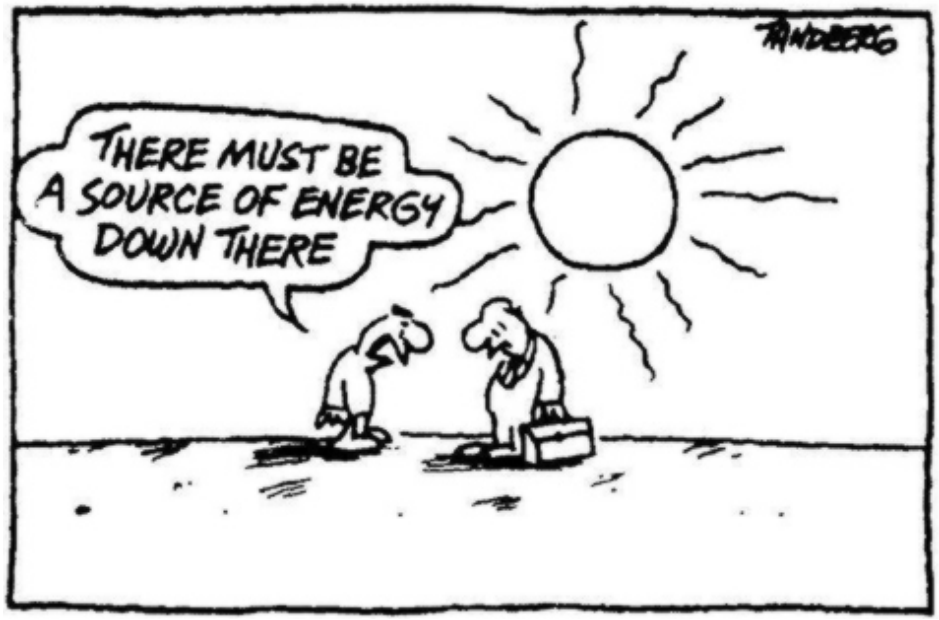
Layout

Solar pros and cons

Solar Cells can be

- Very efficient
- Very sustainable
- Quite costly



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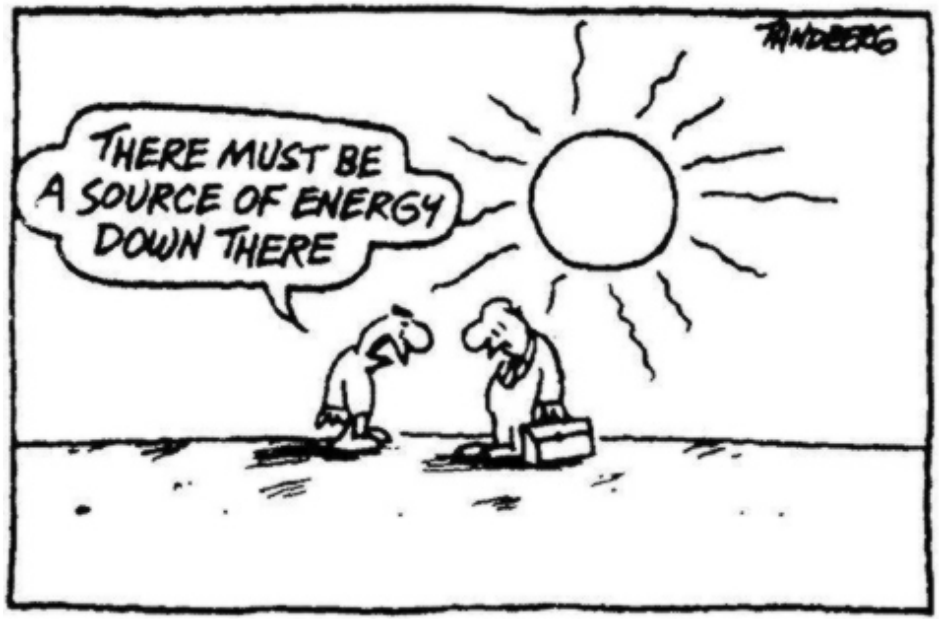

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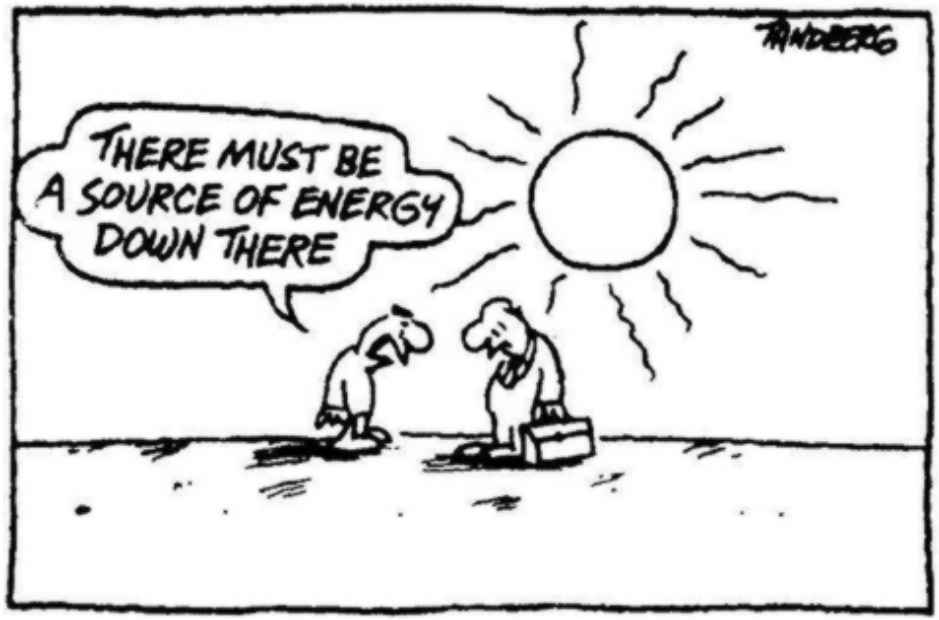

Achieving Conversion

Generic Block, with columns

Block with fig and text

A (poorly) conductive polymer

Generic Block, with columns

Block with fig and text

Making films and devices

Workflow for films

- Clean glass plates
- Mix desired polymer solution
- Spin-coat solution on glass & anneal

Workflow for devices

- Make films as before
- Clean silicon
- Lift-off film from glass then float on film to silicon & anneal
- Evaporate Ag top-contact to Si

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Characterising films and decives

Workflow for films

- Use 4-point probe to measure resistance
- Use spectrometer to measure transmittance
- Use AFM to find film thickness
- Convert resistance to resistivity & transmittance to transmissivity

Workflow for devices

- Measure J-V
- Measure cell area
- Find efficiency η and fill-factor

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Resistivity

Transmissivity

Device Performance

In a nutshell

- PDOT:PSS properties could be optimised
- I learned a lot about solar cells, especially lab skills
- We had a great time

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I would like to thank

Prof. David Cahen

Professor David Cahen for accepting me into his group

I would like to thank

Dr. Ann Erickson

Doctor Ann "Super-Ann" Erickson for sharing her wisdom and skills

I would like to thank

Lior

Lior Sepunaro for undoubtedly the best espresso ever

This project is based on work by

- Thomas R. N. Jansson, Martin P. Haspang, Kåre H. Jensen, Pascal Hersen, and Tomas Bohr, *Polygons on a Rotating Fluid Surface*, Physical Review Letters **96**, 174502 (2006)
- Vatistas, G.H., "A Note on Liquid Vortex Sloshing and Kelvin's Equilibria", JFM, vol. 217, 1990, p. 241.
- Vatistas, G. H., Wang, J., and Lin, S. "Experiments on Waves Induced in the Hollow Core of Vortices". J. Exp. Fluids, vol 13, 1992, p.377.
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