

Kupcinet-Getz Summer School Project

Timo Bretter

Introduction
Schottky-type
solar cells
PDOT:PSS

Experimental.

- ...Procedure
- ...Resuits

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# Kupcinet-Getz Summer School Project

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

#### Timo Bretten

Weizmann Institute of Science Rehovot, Israel

July 30, 2012



# Layout

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### Solar pros and cons

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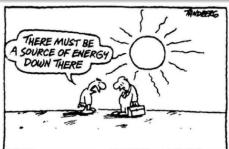
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#### Solar Cells can be



- Very efficient
- Very sustainable
- Quite costly







### Solar pros and cons

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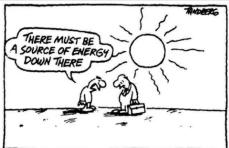
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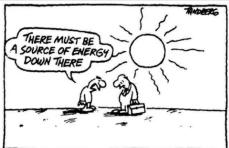
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# **Achieving Conversion**

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### Generic Block, with columns



Block with fig and text



# A (poorly) conductive polymer

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#### Generic Block, with columns



Block with fig and text



# Making films and devices

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#### Workflow for films

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

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



# Making films and devices

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...Procedure

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# Characterising films and decives

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#### 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

- Measure J-V
- Measure cell area
- ullet Find efficiency  $\eta$  and fill-factor



# Characterising films and decives

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# Resistivity

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### Transmissivity

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### Device Performance

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### In a nutshell

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References and Thanks REMEMBER: WITH GREAT POWER COMES GREAT CURRENT SQUARED TIMES RESISTANCE,



OHM NEVER FORGOT HIS DYING UNCLE'S ADVICE.

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



### In a nutshell

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#### Prof. David Cahen



Professor David Cahen for accepting me into his group



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#### Dr. Ann Erickson



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



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#### Lior



Lior Sepunaro for undoubtedly the best espresso ever



# This project is based on work by

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