Increasing Organic Photovoltaic (OPV) Efficiency

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What is a photovoltaic cell?
Why Organic Photovoltaics (OPVs)?
Multiple Orientations of Organic Polymers

- In-plane Orientation
- Out-of-plane Orientation

Strong Absorbing Axis

Substrate
Momentum-Resolved Spectroscopy

Dielectric

Gold Film (40 nm)

Quartz Coverslip

Surface Plasmon Resonance

Light Wave

$\theta_{SP}$
Measuring Reflectivity

- Dielectric
- Gold Film (40 nm)
- Quartz Coverslip
- Incident Light
- Reflected Light
- Surface Plasmon Resonance

$\theta_{SP}$
Modeling Experiment

Reflectivity Theory at $\lambda = 600\text{nm}$

- $R$ vs. $k_{||}/k_0$
Reflectivity Measurements

Quartz and Gold Reflectivity at $\lambda = 600 \text{nm}$
Locating Plasmon Resonance

Gold Reflectivity at $\lambda = 600\,nm$

Data

Gaussian Fit

$k_{\text{plasmon}} = 1.047754$
Dispersion Relation for Gold Film

Dispersion Curve

$k_\parallel$ vs $\lambda$

- Light
- Theory
- Data
Characterizing Organics

- H1 Histone- organic polymer
- In-plane and Out-of-plane orientations
- Demonstrate viability of optimizing orientation to enhance OPV efficiency
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