

Simulation Parameter

Editor

CONFIGURATION

- Simulation Domain
- Run Time
- Grid Specification
- Boundary and Symmetry
- Shutoff Condition

Show More

STRUCTURES

- SiO2
- ITO
- PEDOT
- P3HT
- Al
- ITO_Coating
- Au_Nanosphere

SOURCES

- plane_wave

MONITORS

- reflectance
- transmittance

SCRIPT OBJECTS

3D Chart

2D Chart

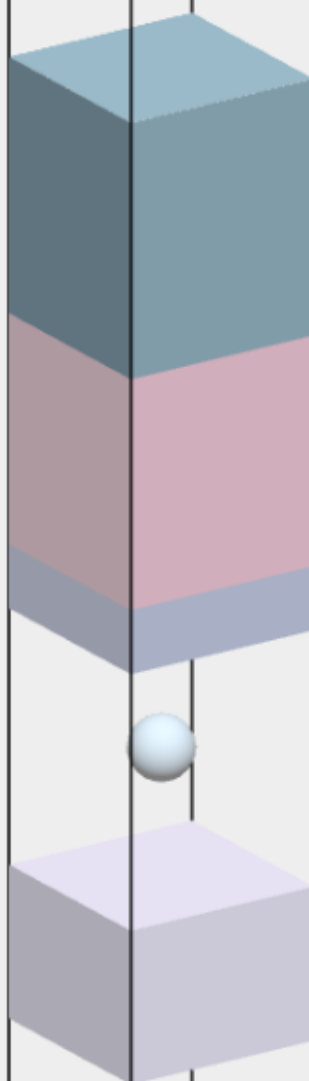
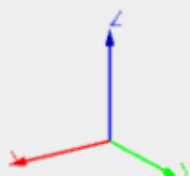
Task Details

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Validation pass

Visibility

- Axes
- Simulation Domain
- Sources(1/1)
- Monitors(2/2)
- Structures(5/7)
 - SiO2
 - ITO
 - PEDOT
 - P3HT
 - Al
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Simulation Parameter



3D Chart

2D Chart

Task Details

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Validation pass

Visibility

Axes

Simulation Domain

Sources(1/1)

Monitors(2/2)

Structures(5/7)

SiO2

ITO

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Al

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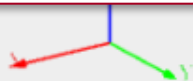
SCRIPT OBJECTS

Optical and Quantum Electronics (2020) 52:275
<https://doi.org/10.1007/s11082-020-02401-w>

Absorption enhancement and efficiency improvement of an organic solar cell embedded with core-shell Au@ITO nanoparticles

Khojasteh Zarei¹ · Farzin Emami¹

Received: 19 March 2020 / Accepted: 13 May 2020 / Published online: 18 May 2020
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Simulation Parameter



STUDIES



FDTD

draft

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structure_0

SOURCES



MONITORS



SCRIPT OBJECTS



Edit Structure

Help



Task Details

Run



1 Error

Detail

Visibility

Axes

Simulation Domain

name

structure_0

* geometry

Box

☒ center + size☐ bounds

center

* size

X

0

 μm

X

 μm

Y

0

 μm

Y

 μm

Z

0

 μm

Z

 μm

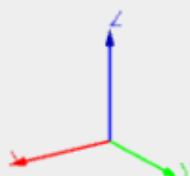
* medium

Select

Load from Library

Create New Medium

Vacuum



Simulation Parameter



STUDIES



FDTD

draft

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Axes

Simulation Domain

name

structure_0

* geometry

Box

☒ center + size☐ bounds

center

* size

X

0

 μm

X

 μm

Y

0

 μm

Y

 μm

Z

0

 μm

Z

 μm

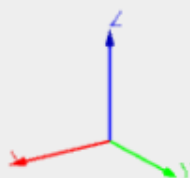
* medium

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Create New Medium

Vacuum



Simulation Parameter



STUDIES



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structure_0

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1 Error

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Simulation Domain

name

structure_0

* geometry

Box

☒ center + size☐ bounds

center

* size

X

0

 μm

X

 μm

Y

0

 μm

Y

 μm

Z

0

 μm

Z

 μm

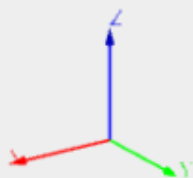
* medium

Select

Load from Library

Create New Medium

Vacuum



Simulation Parameter



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draft

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name

structure_0

* geometry

Box

☒ center + size☐ bounds

center

* size

X

0

 μm

X

 μm

Y

0

 μm

Y

 μm

Z

0

 μm

Z

 μm

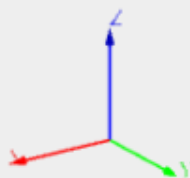
* medium

Select

Load from Library

Create New Medium

Vacuum



Simulation Parameter <

Variable +

Constant

c

pi

inf

Medium +

Vacuum

3D Chart

2D Chart

Task Details

Run

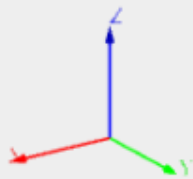
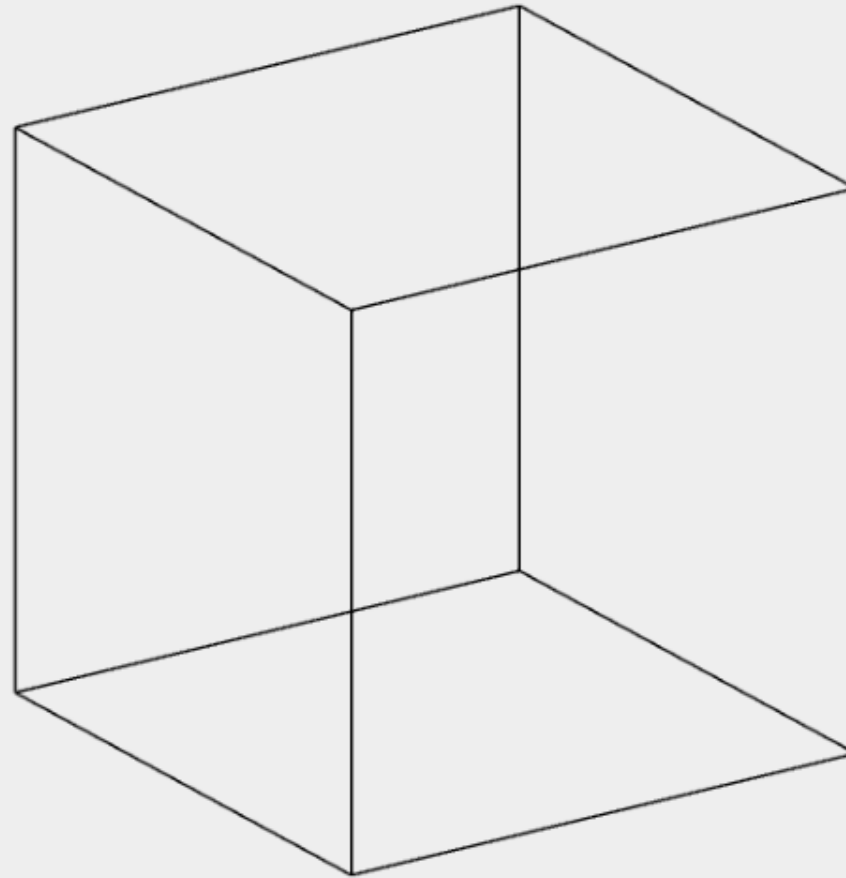
1 Error

Detail

Visibility

Axes

Simulation Domain



Simulation Parameter

Variable

Constant

- c
- pi
- inf

Medium

- Vacuum
- medium_1

Edit Medium Help

* name

medium_1

* type

Medium

☒ permittivity ☐ refractive index

permittivity conductivity

1 0 S/ μ m

+ Load from Library Apply

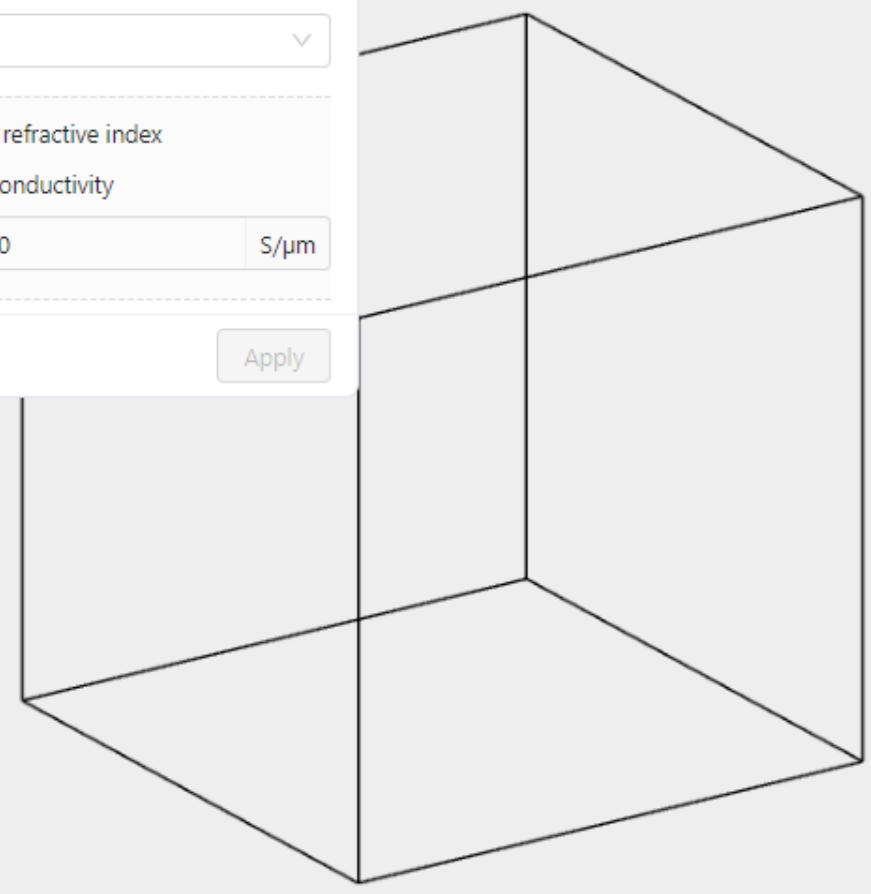
Task Details

Run

1 Error Detail

Visibility

- Axes
- Simulation Domain



+ - ?



SimulationParameter

Variable

Constant

Medium

c

pi

inf

Vacuum

medium_1

Edit MediumHelp

* name

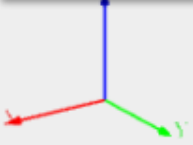
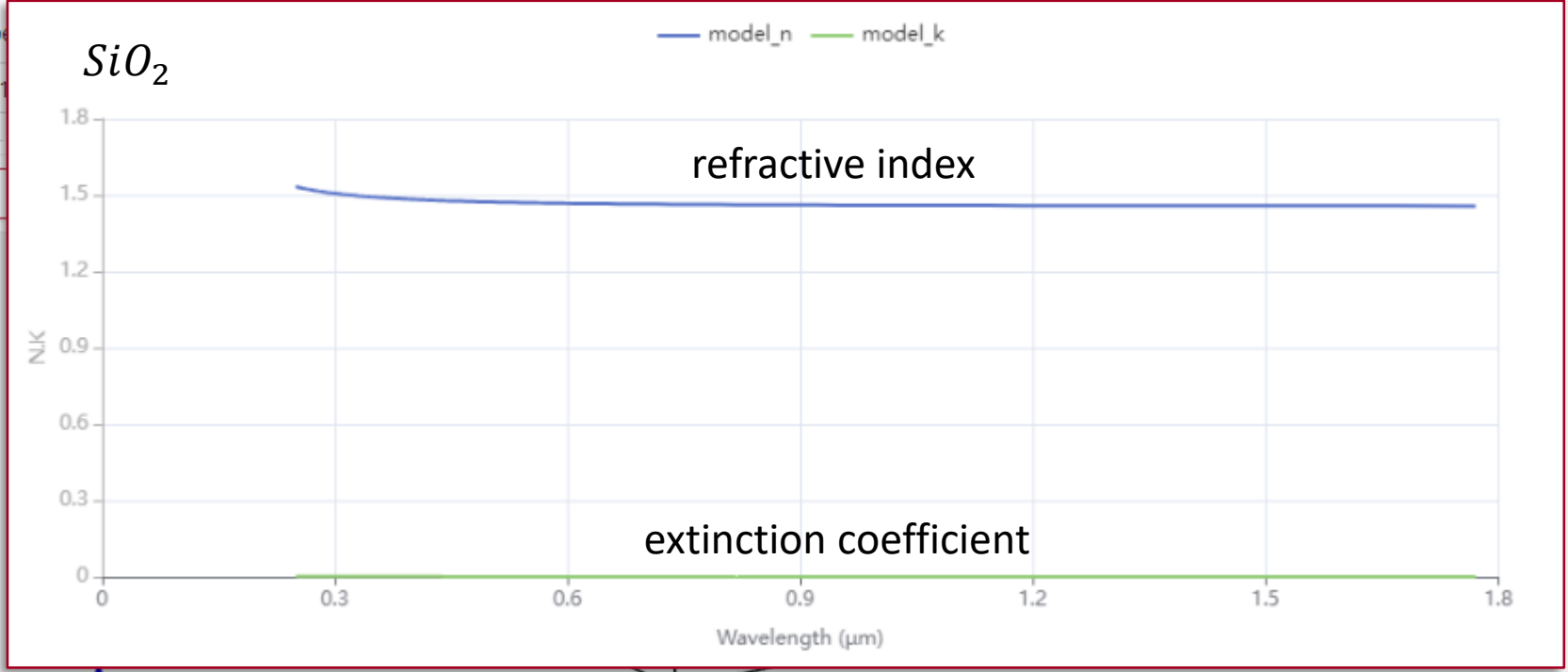
medium_1

* type

Medium

☒ permittivity

☐ refractive index



1 ErrorDetail

Visibility

Axes

Simulation Domain

SimulationParameter<<

Variable

Constant

Medium

c

pi

inf

Vacuum

medium_1

Edit MediumHelp

* name
medium_1

* type
Medium

☒ permittivity☐ refractive index

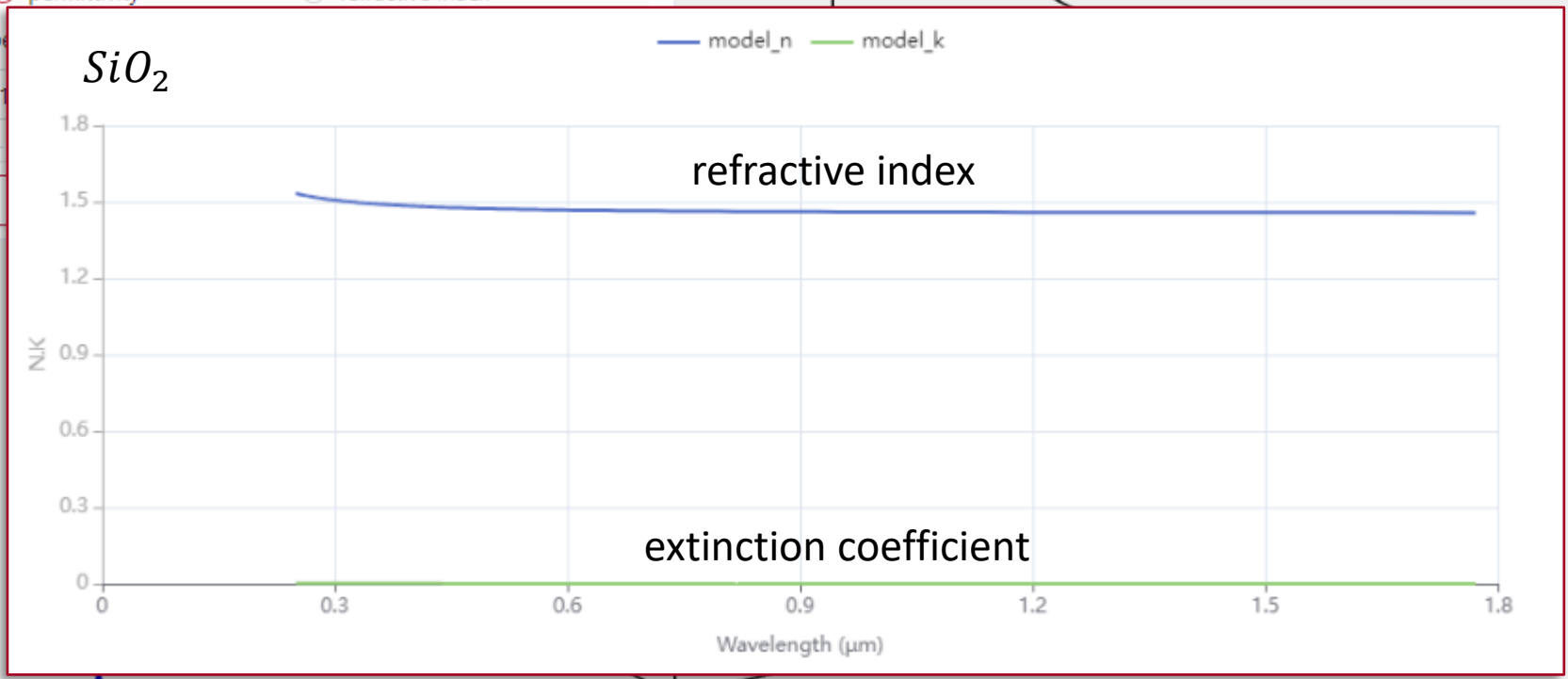


1 ErrorDetail

>I Visibility

Axes

Simulation Domain



Simulation Parameter

Variable

Constant

- c
- pi
- inf

Medium

- Vacuum
- SiO2

Edit Medium Help

* name

SiO2

* type

Medium

☐ permittivity ☒ refractive index

* n

1.45

* k

0

☒ wavelength ☐ frequency

μm

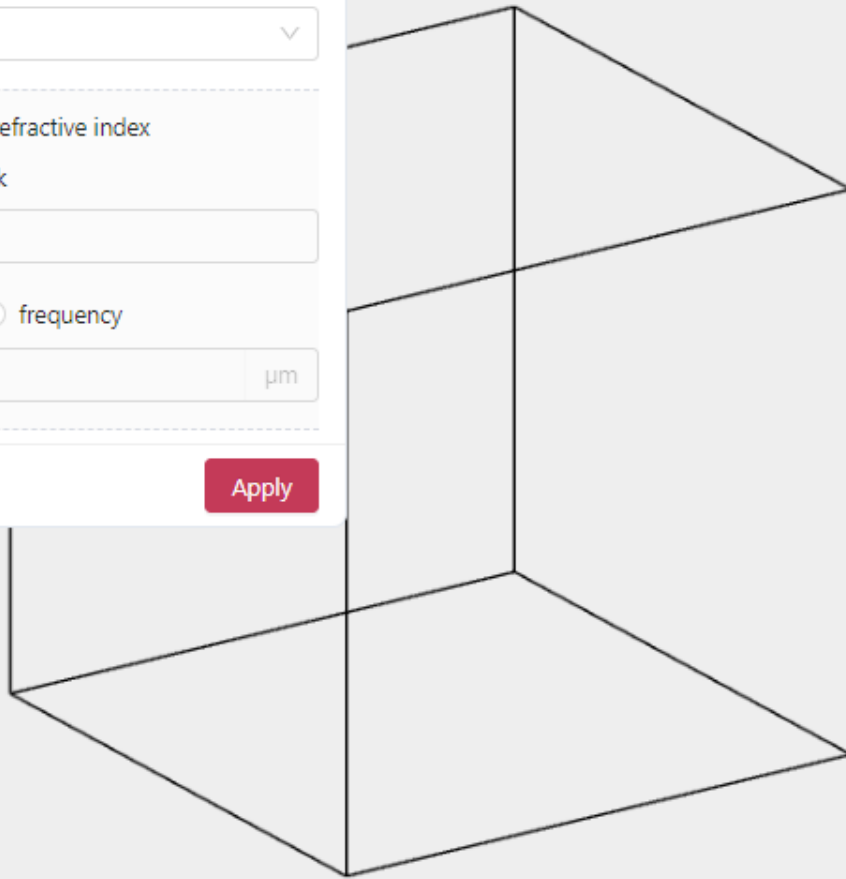
+ Load from Library

Apply

Task Details

Run

1 Error Detail



3D visualization of a simulation domain, showing a wireframe cube. A coordinate system (x, y, z) is visible in the bottom left corner.

Visibility

- Axes
- Simulation Domain

Simulation Parameter

Variable

Constant

- c
- pi
- inf

Medium

- Vacuum
- SiO2
- Si

Edit Medium Help

* name

Si

* type

Medium

☒ permittivity ☐ refractive index

permittivity conductivity

1 0 S/ μ m

Load from Library Apply

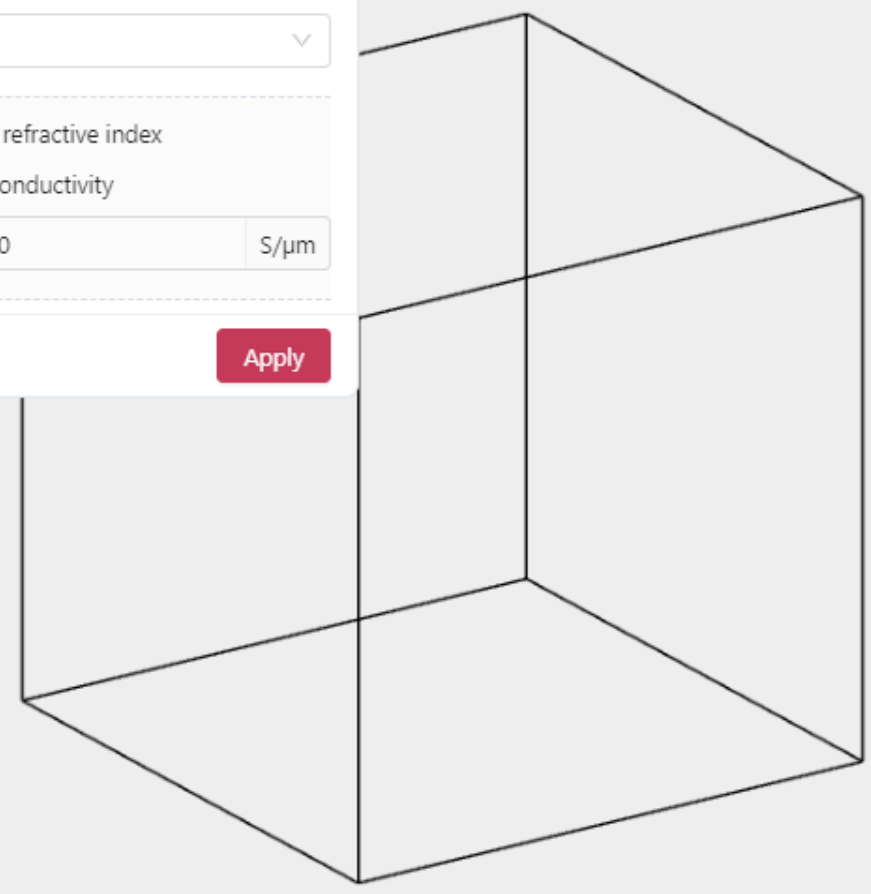
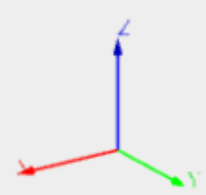
Task Details

Run

1 Error Detail

Visibility

- Axes
- Simulation Domain



Navigation icons: rotate, zoom in, zoom out, refresh, help.



SimulationParameter

Variable

Constant

Medium

Si

Edit MediumHelp

* name

Si

* type

Medium

permittivity

permittivity

1

Load from Lib

Task Details

Run

1 Error

Detail

Visibility

Axes

Simulation Domain

Material Library

Public LibraryMy Library

Search

> Yttrium Oxide ("Y...

> Yttrium Aluminu...

> Zirconium Oxide ...

> Amorphous Silico...

> Crystalline Silico...

SalzburgVilla1957

Li1993_293K

Green2008

model_nmodel_k



☐ logX☐ logY☒ Wavelength☐ Frequency☐ Energy

CancelOK

SimulationParameter

Variable

Constant

Medium

Si

Edit MediumHelp

* name

Si

* type

Medium

permittivity

permittivity

1

Load from Lib

Task Details

Run

1 Error

Detail

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Simulation Domain

Material Library

Public LibraryMy Library

Search

> Yttrium Oxide ("Y...

> Yttrium Aluminu...

> Zirconium Oxide ...

> Amorphous Silico...

> Crystalline Silico...

SalzburgVilla1957

Li1993_293K

Green2008

model_nmodel_k



☐ logX☐ logY☒ Wavelength☐ Frequency☐ Energy

Cancel

OK

Simulation Parameter

Variable

Constant

c

pi

inf

Medium

Vacuum

SiO2

Crystalline Silicon ("cSi...

Edit Medium Help

* name

Crystalline Silicon ("cSi")_Green2008

* type

PoleResidue

Crystalline Silicon ("cSi")_Green2008

frequency_range

min

2.06753e+14

Hz

max

1.19916e+15

Hz

eps_inf

1

poles

a

-51658053347

rad/s

c

531784950915

rad/s

a

-42256450647

rad/s

c

221298736469

rad/s

a

-16931559636

rad/s

c

301374428182

rad/s

a

-37944498107

rad/s

c

110573351871

rad/s

Add Pole

Load from Library

Apply

Task Details

Run

1 Error

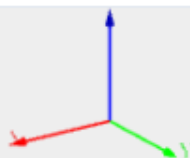
Detail

Visibility

Axes

Simulation Domain

$$\epsilon(\omega) = \epsilon_{\infty} - \sum_i \left[\frac{c_i}{j\omega + a_i} + \frac{c_i^*}{j\omega + a_i^*} \right]$$



Simulation Parameter

Variable

Constant

c

pi

inf

Medium

Vacuum

SiO2

Crystalline Silicon ("cSi...

Edit Medium Help

* name

Crystalline Silicon ("cSi")_Green2008

* type

PoleResidue

Crystalline Silicon ("cSi")_Green2008

frequency_range

min

2.06753e+14

Hz

max

1.19916e+15

Hz

eps_inf

1

poles

a

-51658053347

rad/s

c

531784950915

rad/s

a

-42256450647

rad/s

c

221298736469

rad/s

a

-16931559636

rad/s

c

301374428182

rad/s

a

-37944498107

rad/s

c

110573351871

rad/s

Add Pole

Load from Library

Apply

Task Details

Run

1 Error

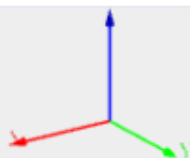
Detail

Visibility

Axes

Simulation Domain

$$\epsilon(\omega) = \epsilon_{\infty} - \sum_i \left[\frac{c_i}{j\omega + a_i} + \frac{c_i^*}{j\omega + a_i^*} \right]$$



Simulation Parameter

- Variable
- Constant
 - c
 - pi
 - inf
- Medium
 - Vacuum
 - SiO2
 - Crystalline Silicon ("cSi...
 - medium_3

Edit Medium Help

* name

medium_3

* type

Medium

- Medium2D
- AnisotropicMedium
- PECMedium
- PoleResidue
- Sellmeier
- Lorentz
- Debye
- Drude

Task Details

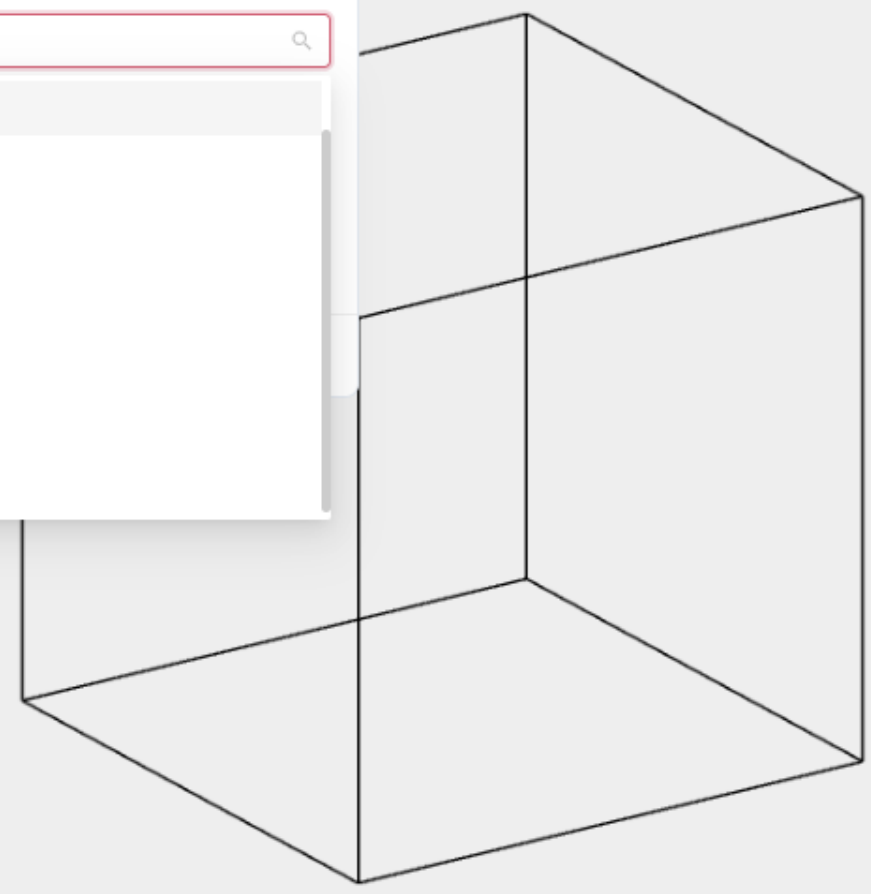
Run

1 Error

Detail

Visibility

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Navigation icons: rotate, zoom in, zoom out, refresh, help



Simulation Parameter

Variable

Constant

c

pi

inf

Medium

Vacuum

SiO2

Crystalline Silicon ("cSi...

medium_3

Edit Medium Help

* name

medium_3

* type

Drude

frequency_range

min

Hz

max

Hz

eps_inf

1

* coeffs

f

Hz

δ

Hz

Add Coefficient

Load from Library

Apply



Drude

A dispersive medium described by the Drude model. The frequency-dependence of the complex-valued permittivity is described by:

$$\epsilon(f) = \epsilon_{\infty} - \sum_i \frac{f_i^2}{f^2 + jf\delta_i}$$

Name

`name` : Optional unique name for medium.

Frequency Range

`frequency_range` : Optional range of validity for the medium.

Type: floating-point number

- Unit: Hz
- Constraint: greater than 0
- Default: None

Simulation Parameter

Variable

Constant

Medium

c

pi

inf

Vacuum

SiO2

Crystalline Silicon ("cSi")_Green2008

Indium Tin Oxide ("ITO")_Horiba

Aluminum ("Al")_Rakic1995

Gold ("Au")_JohnsonChristy1972

3D Chart

2D Chart

Task Details

Run

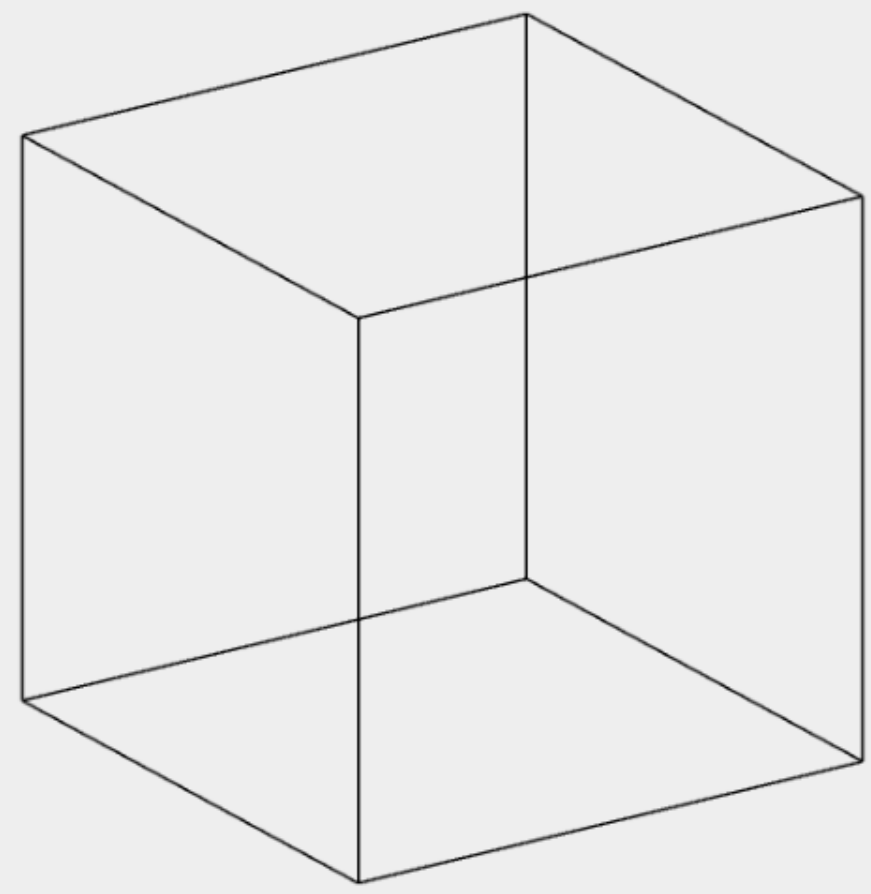
1 Error

Detail

Visibility

Axes

Simulation Domain



+

-

?



Public Library

[Help](#)

Private Library

[Help](#)

Material Fitter

[Help](#)

Click or drag .txt file or .csv file to this area to upload

* num_poles

1

* num_tries

50

* tolerance_rms

0.01

Advanced



Fit

Lossless medium

| wl | n |
|---------|---------|
| [float] | [float] |
| . | . |
| . | . |
| . | . |

Lossy medium

| wl | n | k |
|---------|---------|---------|
| [float] | [float] | [float] |
| . | . | . |
| . | . | . |
| . | . | . |

Public Library

[Help](#)

Private Library

[Help](#)

Material Fitter

[Help](#)

Click or drag .txt file or .csv file to this area to upload

* num_poles

* num_tries

* tolerance_rms

Advanced

[Fit](#)

No simulation plot and data



Public Library

[Help](#)

Private Library

[Help](#)

Material Fitter

[Help](#)

Click or drag .txt file or .csv file to this area to upload

P3HT_ref_index.csv

* num_poles

3

* num_tries

100

* tolerance_rms

0.01

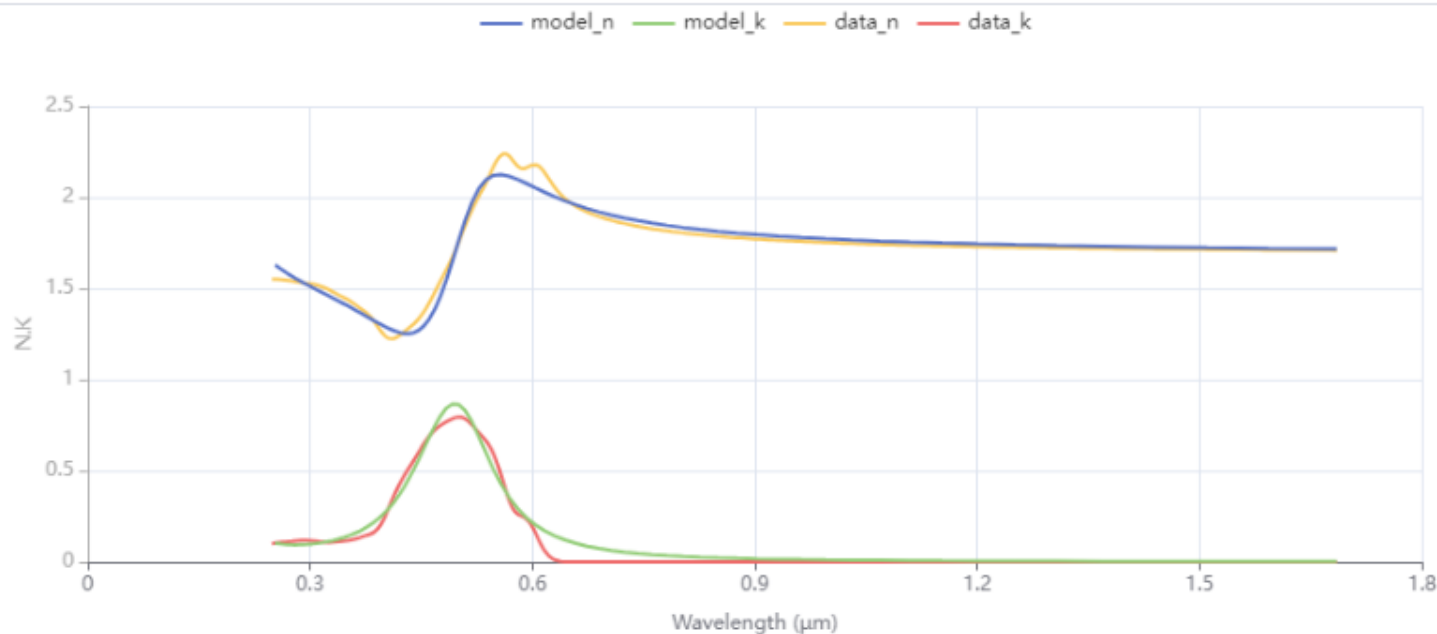
Advanced



Fit

Clear Result

Save

☐ logX ☐ logY ☒ Wavelength ☐ Frequency ☐ Energy

Local data table

| Wavelength | N | K |
|------------|----------|---------|
| 0.24878 | 1.551346 | 0.09871 |

