
opticalmaterials.py Documentation

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CHAPTER 1

Introduction

This documentation supports *opticalmaterialspy*, a library useful for storing and calculating common optical material parameters.

An example script.

2.1 Example 1

```
import opticalmaterialspy as mat

m = mat.SiO2()

# Refractive index @ 1550nm.
print('n(1.55e-6m):', m.n(1.55e-6)) # Knows 1.55e-6 must be [m].
print('n(1.55um):', m.n(1.55)) # Knows 1.55 must be [um].
print('n(1550nm):', m.n(1550)) # Knows 1550 must be [nm].

# Group velocity refractive index @ 900nm.
print('n_gv(900nm):', m.ng(900))

# Group velocity dispersion @ 808nm.
print('GVD(0.808um):', m.gvd(0.808))
```


3.1 Materials

3.1.1 Classes

| | |
|--|--|
| <i>Air</i> () | |
| <i>Al2O3</i> (axis) | |
| <i>Bbo</i> (axis) | |
| <i>Bibo</i> (axis) | |
| <i>Chalcogenide</i> (chalcogenideType) | |
| <i>Data</i> (wls, ns) | An object that facilitates importing materials from lists. |
| <i>Ktp</i> (axis) | |
| <i>Ln</i> (axis[, temperatureCelcius]) | |
| <i>LnMg</i> (axis) | |
| <i>LnMgTemp</i> (axis[, temperatureCelcius]) | |
| <i>RefractiveIndexWeb</i> (web_link) | Object to create a <i>_Material</i> based on data from https://refractiveindex.info/ . |
| <i>SiO2</i> () | |
| <i>Su8</i> () | |
| <i>Tfln</i> (axis[, temperatureCelcius]) | |
| <i>TiO2</i> (axis) | |

Air

class Air

Bases: opticalmaterialspy._material_base._Material

Methods Summary

| | |
|---|---|
| <code>beta0(wavelength)</code> | The propagation constant with respect to wavelength. |
| <code>beta1(wavelength)</code> | The derivative of the propagation constant with respect to wavelength. |
| <code>beta2(wavelength)</code> | The second derivative of the propagation constant with respect to wavelength. |
| <code>convertWavelengthUnitsNm()</code> | |
| <code>eps([wavelength])</code> | The permittivity of the desired material. |
| <code>gvd(wavelength)</code> | The group velocity dispersion (GVD) with respect to wavelength. |
| <code>n([wavelength])</code> | The refractive index of the desired material. |
| <code>nDer1(wavelength)</code> | The first derivative of the refractive index with respect to wavelength. |
| <code>nDer2(wavelength)</code> | The second derivative of the refractive index with respect to wavelength. |
| <code>ng(wavelength)</code> | The group index with respect to wavelength. |
| <code>vg(wavelength)</code> | The group velocities with respect to wavelength. |
| <code>z0(wavelength)</code> | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

`beta0(wavelength)`

The propagation constant with respect to wavelength.

Parameters `wavelength` (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

`beta1(wavelength)`

The derivative of the propagation constant with respect to wavelength.

Parameters `wavelength` (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

`beta2(wavelength)`

The second derivative of the propagation constant with respect to wavelength.

Parameters `wavelength` (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

`convertWavelengthUnitsNm()`

`eps(wavelength=None)`

The permittivity of the desired material.

Parameters `wavelength` (*float*, *list*, *None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

Al2O3

class **Al2O3** (*axis*)

Bases: opticalmaterialspy._material_base._Material

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |
| <i>gvd</i> (wavelength) | The group velocity dispersion (GVD) with respect to wavelength. |
| <i>n</i> ([wavelength]) | The refractive index of the desired material. |
| <i>nDer1</i> (wavelength) | The first derivative of the refractive index with respect to wavelength. |
| <i>nDer2</i> (wavelength) | The second derivative of the refractive index with respect to wavelength. |
| <i>ng</i> (wavelength) | The group index with respect to wavelength. |
| <i>vg</i> (wavelength) | The group velocities with respect to wavelength. |
| <i>z0</i> (wavelength) | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm ()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

Bbo

class **Bbo** (*axis*)

Bases: opticalmaterialspy._material_base._Material

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |
| <i>gvd</i> (wavelength) | The group velocity dispersion (GVD) with respect to wavelength. |
| <i>n</i> ([wavelength]) | The refractive index of the desired material. |
| <i>nDer1</i> (wavelength) | The first derivative of the refractive index with respect to wavelength. |
| <i>nDer2</i> (wavelength) | The second derivative of the refractive index with respect to wavelength. |
| <i>ng</i> (wavelength) | The group index with respect to wavelength. |
| <i>vg</i> (wavelength) | The group velocities with respect to wavelength. |
| <i>z0</i> (wavelength) | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm ()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

Bibo

class Bibo (*axis*)

Bases: *opticalmaterialspy.material.Bbo*

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |

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Table 5 – continued from previous page

| | |
|--------------------------------|---|
| <code>gvd(wavelength)</code> | The group velocity dispersion (GVD) with respect to wavelength. |
| <code>n([wavelength])</code> | The refractive index of the desired material. |
| <code>nDer1(wavelength)</code> | The first derivative of the refractive index with respect to wavelength. |
| <code>nDer2(wavelength)</code> | The second derivative of the refractive index with respect to wavelength. |
| <code>ng(wavelength)</code> | The group index with respect to wavelength. |
| <code>vg(wavelength)</code> | The group velocities with respect to wavelength. |
| <code>z0(wavelength)</code> | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

`beta0(wavelength)`

The propagation constant with respect to wavelength.

Parameters `wavelength` (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

`beta1(wavelength)`

The derivative of the propagation constant with respect to wavelength.

Parameters `wavelength` (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

`beta2(wavelength)`

The second derivative of the propagation constant with respect to wavelength.

Parameters `wavelength` (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

`convertWavelengthUnitsNm()`

`eps(wavelength=None)`

The permittivity of the desired material.

Parameters `wavelength` (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

`gvd(wavelength)`

The group velocity dispersion (GVD) with respect to wavelength.

Parameters `wavelength` (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

Chalcogenide

class Chalcogenide (*chalcogenideType*)

Bases: opticalmaterialspy._material_base._Material

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |
| <i>gvd</i> (wavelength) | The group velocity dispersion (GVD) with respect to wavelength. |
| <i>n</i> ([wavelength]) | The refractive index of the desired material. |
| <i>nDer1</i> (wavelength) | The first derivative of the refractive index with respect to wavelength. |
| <i>nDer2</i> (wavelength) | The second derivative of the refractive index with respect to wavelength. |
| <i>ng</i> (wavelength) | The group index with respect to wavelength. |
| <i>vg</i> (wavelength) | The group velocities with respect to wavelength. |
| <i>z0</i> (wavelength) | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

Data

class Data (*wls, ns*)

Bases: opticalmaterialspy._material_base._Material

An object that facilitates importing materials from lists.

Parameters

- **wls** (*list*) – List of wavelengths.
- **ns** (*list*) – List of refractive indices at the corresponding *wls*. Should be the same size as *wls*.

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |
| <i>gvd</i> (wavelength) | The group velocity dispersion (GVD) with respect to wavelength. |
| <i>n</i> ([wavelength]) | The refractive index of the desired material. |
| <i>nDer1</i> (wavelength) | The first derivative of the refractive index with respect to wavelength. |
| <i>nDer2</i> (wavelength) | The second derivative of the refractive index with respect to wavelength. |
| <i>ng</i> (wavelength) | The group index with respect to wavelength. |
| <i>vg</i> (wavelength) | The group velocities with respect to wavelength. |
| <i>z0</i> (wavelength) | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm ()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

Ktp

class Ktp (*axis*)

Bases: opticalmaterialspy._material_base._Material

Methods Summary

| | |
|---------------------------|--|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |

Continued on next page

Table 8 – continued from previous page

| | |
|---|---|
| <code>beta2(wavelength)</code> | The second derivative of the propagation constant with respect to wavelength. |
| <code>convertWavelengthUnitsNm()</code> | |
| <code>eps([wavelength])</code> | The permittivity of the desired material. |
| <code>gvd(wavelength)</code> | The group velocity dispersion (GVD) with respect to wavelength. |
| <code>n([wavelength])</code> | The refractive index of the desired material. |
| <code>nDer1(wavelength)</code> | The first derivative of the refractive index with respect to wavelength. |
| <code>nDer2(wavelength)</code> | The second derivative of the refractive index with respect to wavelength. |
| <code>ng(wavelength)</code> | The group index with respect to wavelength. |
| <code>vg(wavelength)</code> | The group velocities with respect to wavelength. |
| <code>z0(wavelength)</code> | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm ()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

Ln

class `Ln` (*axis*, *temperatureCelcius=20.0*)

Bases: `opticalmaterialspy._material_base._Material`

Methods Summary

| | |
|---|---|
| <code>beta0(wavelength)</code> | The propagation constant with respect to wavelength. |
| <code>beta1(wavelength)</code> | The derivative of the propagation constant with respect to wavelength. |
| <code>beta2(wavelength)</code> | The second derivative of the propagation constant with respect to wavelength. |
| <code>convertWavelengthUnitsNm()</code> | |
| <code>eps([wavelength])</code> | The permittivity of the desired material. |
| <code>gvd(wavelength)</code> | The group velocity dispersion (GVD) with respect to wavelength. |
| <code>n([wavelength])</code> | The refractive index of the desired material. |
| <code>nDer1(wavelength)</code> | The first derivative of the refractive index with respect to wavelength. |
| <code>nDer2(wavelength)</code> | The second derivative of the refractive index with respect to wavelength. |
| <code>ng(wavelength)</code> | The group index with respect to wavelength. |
| <code>vg(wavelength)</code> | The group velocities with respect to wavelength. |
| <code>z0(wavelength)</code> | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

LnMg

class **LnMg** (*axis*)

Bases: opticalmaterialspy._material_base._Material

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |
| <i>gvd</i> (wavelength) | The group velocity dispersion (GVD) with respect to wavelength. |
| <i>n</i> ([wavelength]) | The refractive index of the desired material. |
| <i>nDer1</i> (wavelength) | The first derivative of the refractive index with respect to wavelength. |
| <i>nDer2</i> (wavelength) | The second derivative of the refractive index with respect to wavelength. |
| <i>ng</i> (wavelength) | The group index with respect to wavelength. |
| <i>vg</i> (wavelength) | The group velocities with respect to wavelength. |
| <i>z0</i> (wavelength) | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation

constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm ()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

LnMgTemp

class **LnMgTemp** (*axis, temperatureCelsius=20.0*)

Bases: opticalmaterialspy._material_base._Material

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |
| <i>gvd</i> (wavelength) | The group velocity dispersion (GVD) with respect to wavelength. |
| <i>n</i> ([wavelength]) | The refractive index of the desired material. |

Continued on next page

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| | |
|---------------------------|---|
| <i>nDer1</i> (wavelength) | The first derivative of the refractive index with respect to wavelength. |
| <i>nDer2</i> (wavelength) | The second derivative of the refractive index with respect to wavelength. |
| <i>ng</i> (wavelength) | The group index with respect to wavelength. |
| <i>vg</i> (wavelength) | The group velocities with respect to wavelength. |
| <i>z0</i> (wavelength) | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

RefractiveIndexWeb

class **RefractiveIndexWeb** (*web_link*)

Bases: *opticalmaterialspy.material.Data*

Object to create a *_Material* based on data from <https://refractiveindex.info/>.

Parameters **web_link** (*str*) – The web link to the material. As an example, for GaAs by Aspnes et al. 1986 the one should use ‘<https://refractiveindex.info/?shelf=main&book=GaAs&page=Aspnes>’.

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |
| <i>gvd</i> (wavelength) | The group velocity dispersion (GVD) with respect to wavelength. |
| <i>n</i> ([wavelength]) | The refractive index of the desired material. |
| <i>nDer1</i> (wavelength) | The first derivative of the refractive index with respect to wavelength. |
| <i>nDer2</i> (wavelength) | The second derivative of the refractive index with respect to wavelength. |
| <i>ng</i> (wavelength) | The group index with respect to wavelength. |
| <i>vg</i> (wavelength) | The group velocities with respect to wavelength. |
| <i>z0</i> (wavelength) | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

SiO2

class SiO2

Bases: opticalmaterialspy._material_base._Material

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |
| <i>gvd</i> (wavelength) | The group velocity dispersion (GVD) with respect to wavelength. |
| <i>n</i> ([wavelength]) | The refractive index of the desired material. |
| <i>nDer1</i> (wavelength) | The first derivative of the refractive index with respect to wavelength. |
| <i>nDer2</i> (wavelength) | The second derivative of the refractive index with respect to wavelength. |
| <i>ng</i> (wavelength) | The group index with respect to wavelength. |
| <i>vg</i> (wavelength) | The group velocities with respect to wavelength. |
| <i>z0</i> (wavelength) | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm ()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

Su8

class Su8

Bases: opticalmaterialspy._material_base._Material

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |
| <i>gvd</i> (wavelength) | The group velocity dispersion (GVD) with respect to wavelength. |
| <i>n</i> ([wavelength]) | The refractive index of the desired material. |
| <i>nDer1</i> (wavelength) | The first derivative of the refractive index with respect to wavelength. |
| <i>nDer2</i> (wavelength) | The second derivative of the refractive index with respect to wavelength. |
| <i>ng</i> (wavelength) | The group index with respect to wavelength. |

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Table 14 – continued from previous page

| | |
|-----------------------------|---|
| <code>vg(wavelength)</code> | The group velocities with respect to wavelength. |
| <code>z0(wavelength)</code> | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm ()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

Tfln

class **Tfln** (*axis, temperatureCelcius=20.0*)

Bases: `opticalmaterialspy.material.Ln`

Methods Summary

| | |
|---|---|
| <code>beta0(wavelength)</code> | The propagation constant with respect to wavelength. |
| <code>beta1(wavelength)</code> | The derivative of the propagation constant with respect to wavelength. |
| <code>beta2(wavelength)</code> | The second derivative of the propagation constant with respect to wavelength. |
| <code>convertWavelengthUnitsNm()</code> | |
| <code>eps([wavelength])</code> | The permittivity of the desired material. |
| <code>gvd(wavelength)</code> | The group velocity dispersion (GVD) with respect to wavelength. |
| <code>n([wavelength])</code> | The refractive index of the desired material. |
| <code>nDer1(wavelength)</code> | The first derivative of the refractive index with respect to wavelength. |
| <code>nDer2(wavelength)</code> | The second derivative of the refractive index with respect to wavelength. |
| <code>ng(wavelength)</code> | The group index with respect to wavelength. |
| <code>vg(wavelength)</code> | The group velocities with respect to wavelength. |
| <code>z0(wavelength)</code> | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

`beta0(wavelength)`

The propagation constant with respect to wavelength.

Parameters `wavelength` (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type *float*, *list*

`beta1(wavelength)`

The derivative of the propagation constant with respect to wavelength.

Parameters `wavelength` (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type *float*, *list*

`beta2(wavelength)`

The second derivative of the propagation constant with respect to wavelength.

Parameters `wavelength` (*float*, *list*, *None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type *float*, *list*

`convertWavelengthUnitsNm()`

`eps(wavelength=None)`

The permittivity of the desired material.

Parameters `wavelength` (*float*, *list*, *None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

TiO2

class **TiO2** (*axis*)

Bases: opticalmaterialspy._material_base._Material

Methods Summary

| | |
|------------------------------------|---|
| <i>beta0</i> (wavelength) | The propagation constant with respect to wavelength. |
| <i>beta1</i> (wavelength) | The derivative of the propagation constant with respect to wavelength. |
| <i>beta2</i> (wavelength) | The second derivative of the propagation constant with respect to wavelength. |
| <i>convertWavelengthUnitsNm</i> () | |
| <i>eps</i> ([wavelength]) | The permittivity of the desired material. |
| <i>gvd</i> (wavelength) | The group velocity dispersion (GVD) with respect to wavelength. |
| <i>n</i> ([wavelength]) | The refractive index of the desired material. |
| <i>nDer1</i> (wavelength) | The first derivative of the refractive index with respect to wavelength. |
| <i>nDer2</i> (wavelength) | The second derivative of the refractive index with respect to wavelength. |
| <i>ng</i> (wavelength) | The group index with respect to wavelength. |
| <i>vg</i> (wavelength) | The group velocities with respect to wavelength. |
| <i>z0</i> (wavelength) | The wave impedance assuming the material is dielectric (not lossy or magnetic). |

Methods Documentation

beta0 (*wavelength*)

The propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta1 (*wavelength*)

The derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

beta2 (*wavelength*)

The second derivative of the propagation constant with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The propagation constant at the target wavelength(s).

Return type float, list

convertWavelengthUnitsNm ()

eps (*wavelength=None*)

The permittivity of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the permittivity will be evaluated at.

Returns The permittivity at the target wavelength.

Return type float, list

gvd (*wavelength*)

The group velocity dispersion (GVD) with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the GVD will be evaluated at.

Returns The GVD at the target wavelength(s).

Return type float, list

n (*wavelength=None*)

The refractive index of the desired material.

Parameters **wavelength** (*float, list, None*) – The wavelength the refractive index will be evaluated at.

Returns The refractive index at the target wavelength.

Return type float, list

nDer1 (*wavelength*)

The first derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

nDer2 (*wavelength*)

The second derivative of the refractive index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the derivative will be evaluated at.

Returns The refractive index at the target wavelength(s).

Return type float, list

ng (*wavelength*)

The group index with respect to wavelength.

Parameters **wavelength** (*float, list, None*) – The wavelength(s) the group index will be evaluated at.

Returns The group index at the target wavelength(s).

Return type float, list

vg (*wavelength*)

The group velocities with respect to wavelength.

Parameters wavelength (*float, list, None*) – The wavelength(s) the group velocities will be evaluated at.

Returns The group velocities at the target wavelength(s).

Return type float, list

z0 (*wavelength*)

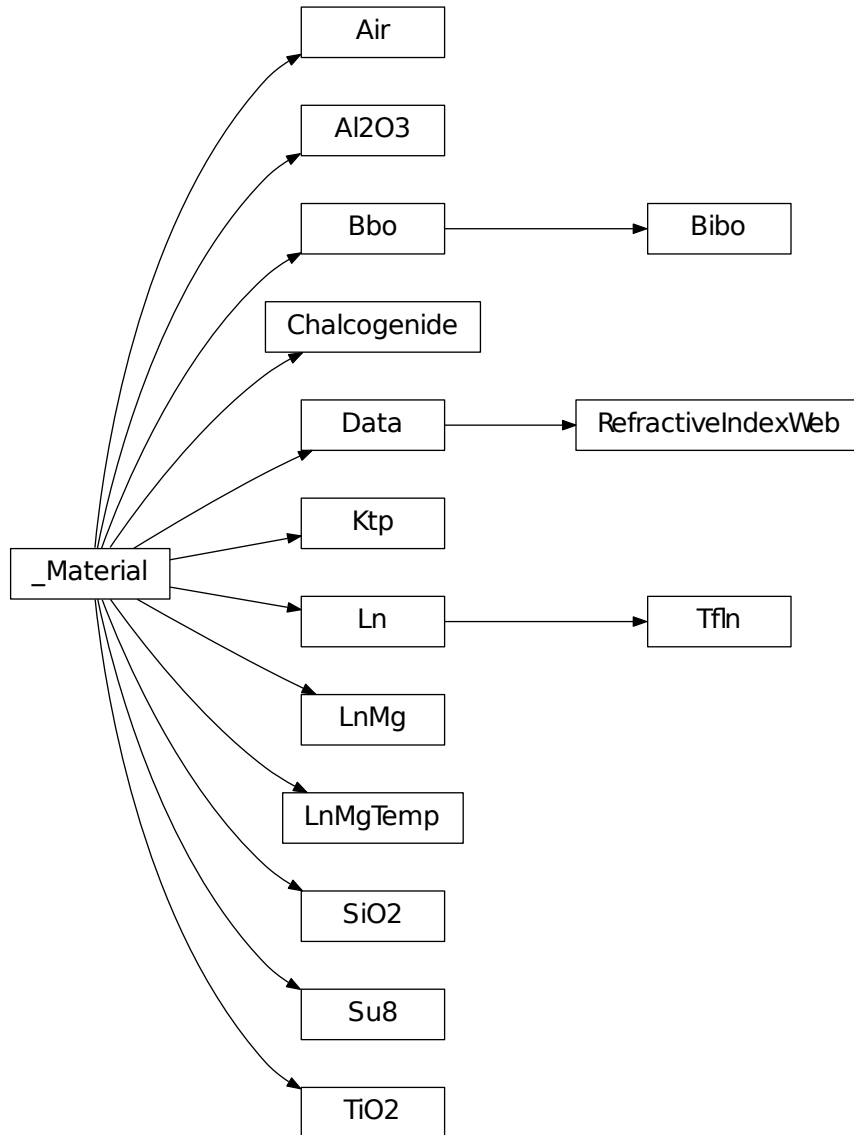
The wave impedance assuming the material is dielectric (not lossy or magnetic).

Parameters wavelength (*float, list, None*) – The wavelength(s) the propagation constant will be evaluated at.

Returns The impedance of the material.

Return type float, list

3.1.2 Class Inheritance Diagram



O

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A

Air (class in opticalmaterials.py.material), 7
 Al2O3 (class in opticalmaterials.py.material), 10

B

Bbo (class in opticalmaterials.py.material), 12
 beta0() (Air method), 8
 beta0() (Al2O3 method), 10
 beta0() (Bbo method), 12
 beta0() (Bibo method), 15
 beta0() (Chalcogenide method), 17
 beta0() (Data method), 20
 beta0() (Ktp method), 22
 beta0() (Ln method), 24
 beta0() (LnMg method), 26
 beta0() (LnMgTemp method), 29
 beta0() (RefractiveIndexWeb method), 31
 beta0() (SiO2 method), 33
 beta0() (Su8 method), 36
 beta0() (Tfln method), 38
 beta0() (TiO2 method), 40
 beta1() (Air method), 8
 beta1() (Al2O3 method), 10
 beta1() (Bbo method), 13
 beta1() (Bibo method), 15
 beta1() (Chalcogenide method), 17
 beta1() (Data method), 20
 beta1() (Ktp method), 22
 beta1() (Ln method), 24
 beta1() (LnMg method), 27
 beta1() (LnMgTemp method), 29
 beta1() (RefractiveIndexWeb method), 31
 beta1() (SiO2 method), 33
 beta1() (Su8 method), 36
 beta1() (Tfln method), 38
 beta1() (TiO2 method), 40
 beta2() (Air method), 8
 beta2() (Al2O3 method), 10
 beta2() (Bbo method), 13

beta2() (Bibo method), 15
 beta2() (Chalcogenide method), 17
 beta2() (Data method), 20
 beta2() (Ktp method), 22
 beta2() (Ln method), 24
 beta2() (LnMg method), 27
 beta2() (LnMgTemp method), 29
 beta2() (RefractiveIndexWeb method), 31
 beta2() (SiO2 method), 34
 beta2() (Su8 method), 36
 beta2() (Tfln method), 38
 beta2() (TiO2 method), 40
 Bibo (class in opticalmaterials.py.material), 14

C

Chalcogenide (class in opticalmaterials.py.material), 17
 convertWavelengthUnitsNm() (Air method), 8
 convertWavelengthUnitsNm() (Al2O3 method), 11
 convertWavelengthUnitsNm() (Bbo method), 13
 convertWavelengthUnitsNm() (Bibo method), 15
 convertWavelengthUnitsNm() (Chalcogenide method), 18
 convertWavelengthUnitsNm() (Data method), 20
 convertWavelengthUnitsNm() (Ktp method), 22
 convertWavelengthUnitsNm() (Ln method), 25
 convertWavelengthUnitsNm() (LnMg method), 27
 convertWavelengthUnitsNm() (LnMgTemp method), 29
 convertWavelengthUnitsNm() (RefractiveIndexWeb method), 32
 convertWavelengthUnitsNm() (SiO2 method), 34
 convertWavelengthUnitsNm() (Su8 method), 36
 convertWavelengthUnitsNm() (Tfln method), 38
 convertWavelengthUnitsNm() (TiO2 method), 41

D

Data (class in opticalmaterials.py.material), 19

E

eps() (Air method), 8

eps() (Al2O3 method), 11
 eps() (Bbo method), 13
 eps() (Bibo method), 15
 eps() (Chalcogenide method), 18
 eps() (Data method), 20
 eps() (Ktp method), 22
 eps() (Ln method), 25
 eps() (LnMg method), 27
 eps() (LnMgTemp method), 29
 eps() (RefractiveIndexWeb method), 32
 eps() (SiO2 method), 34
 eps() (Su8 method), 36
 eps() (Tfln method), 38
 eps() (TiO2 method), 41

G

gvd() (Air method), 9
 gvd() (Al2O3 method), 11
 gvd() (Bbo method), 13
 gvd() (Bibo method), 15
 gvd() (Chalcogenide method), 18
 gvd() (Data method), 20
 gvd() (Ktp method), 22
 gvd() (Ln method), 25
 gvd() (LnMg method), 27
 gvd() (LnMgTemp method), 29
 gvd() (RefractiveIndexWeb method), 32
 gvd() (SiO2 method), 34
 gvd() (Su8 method), 36
 gvd() (Tfln method), 39
 gvd() (TiO2 method), 41

K

Ktp (class in opticalmaterialspy.material), 21

L

Ln (class in opticalmaterialspy.material), 24
 LnMg (class in opticalmaterialspy.material), 26
 LnMgTemp (class in opticalmaterialspy.material), 28

N

n() (Air method), 9
 n() (Al2O3 method), 11
 n() (Bbo method), 13
 n() (Bibo method), 16
 n() (Chalcogenide method), 18
 n() (Data method), 20
 n() (Ktp method), 23
 n() (Ln method), 25
 n() (LnMg method), 27
 n() (LnMgTemp method), 29
 n() (RefractiveIndexWeb method), 32
 n() (SiO2 method), 34

n() (Su8 method), 36
 n() (Tfln method), 39
 n() (TiO2 method), 41
 nDer1() (Air method), 9
 nDer1() (Al2O3 method), 11
 nDer1() (Bbo method), 13
 nDer1() (Bibo method), 16
 nDer1() (Chalcogenide method), 18
 nDer1() (Data method), 20
 nDer1() (Ktp method), 23
 nDer1() (Ln method), 25
 nDer1() (LnMg method), 27
 nDer1() (LnMgTemp method), 30
 nDer1() (RefractiveIndexWeb method), 32
 nDer1() (SiO2 method), 34
 nDer1() (Su8 method), 37
 nDer1() (Tfln method), 39
 nDer1() (TiO2 method), 41
 nDer2() (Air method), 9
 nDer2() (Al2O3 method), 11
 nDer2() (Bbo method), 14
 nDer2() (Bibo method), 16
 nDer2() (Chalcogenide method), 18
 nDer2() (Data method), 21
 nDer2() (Ktp method), 23
 nDer2() (Ln method), 25
 nDer2() (LnMg method), 27
 nDer2() (LnMgTemp method), 30
 nDer2() (RefractiveIndexWeb method), 32
 nDer2() (SiO2 method), 34
 nDer2() (Su8 method), 37
 nDer2() (Tfln method), 39
 nDer2() (TiO2 method), 41
 ng() (Air method), 9
 ng() (Al2O3 method), 11
 ng() (Bbo method), 14
 ng() (Bibo method), 16
 ng() (Chalcogenide method), 18
 ng() (Data method), 21
 ng() (Ktp method), 23
 ng() (Ln method), 25
 ng() (LnMg method), 28
 ng() (LnMgTemp method), 30
 ng() (RefractiveIndexWeb method), 32
 ng() (SiO2 method), 35
 ng() (Su8 method), 37
 ng() (Tfln method), 39
 ng() (TiO2 method), 41

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spy.material), 30

S

SiO2 (class in opticalmaterialspy.material), 33

Su8 (class in opticalmaterialspy.material), 35

T

Tfln (class in opticalmaterialspy.material), 37

TiO2 (class in opticalmaterialspy.material), 40

V

vg() (Air method), 9

vg() (Al2O3 method), 12

vg() (Bbo method), 14

vg() (Bibo method), 16

vg() (Chalcogenide method), 18

vg() (Data method), 21

vg() (Ktp method), 23

vg() (Ln method), 26

vg() (LnMg method), 28

vg() (LnMgTemp method), 30

vg() (RefractiveIndexWeb method), 32

vg() (SiO2 method), 35

vg() (Su8 method), 37

vg() (Tfln method), 39

vg() (TiO2 method), 42

Z

z0() (Air method), 9

z0() (Al2O3 method), 12

z0() (Bbo method), 14

z0() (Bibo method), 16

z0() (Chalcogenide method), 19

z0() (Data method), 21

z0() (Ktp method), 23

z0() (Ln method), 26

z0() (LnMg method), 28

z0() (LnMgTemp method), 30

z0() (RefractiveIndexWeb method), 33

z0() (SiO2 method), 35

z0() (Su8 method), 37

z0() (Tfln method), 39

z0() (TiO2 method), 42