opticalmaterialspy Documentation

Release 0.1

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Sep 14, 2023

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INTRODUCTION

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

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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))
```

CHAPTER

THREE

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3.1.1 Classes

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Chalcogenide(chalcogenideType)	
Data(wls, ns)	An object that facilitates importing materials from lists.
Ktp(axis)	
Ln(axis[, temperatureCelcius])	
LnMg(axis)	
LnMgTemp(axis[, temperatureCelcius])	
RefractiveIndexWeb(web_link)	Object to create a *_Material* based on data from https://refractiveindex.info/.
RefractiveIndexWebCSVLink(csv_link)	Object to create a *_Material* based on data from https://refractiveindex.info/.
SiO2()	
Su8()	
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Air

class Air

Bases: _Material

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: _Material

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: _Material

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: *Bbo*

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: _Material

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: _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

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: _Material

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

`gvd`(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: `_Material`

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

`gvd`(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: _Material

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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*, *temperatureCelcius=20.0*)

Bases: `_Material`

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: *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

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

`gvd`(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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

RefractiveIndexWebCSVLink

class RefractiveIndexWebCSVLink(*csv_link*)

Bases: *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

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

`gvd`(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: _Material

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: _Material

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: *Ln*

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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: _Material

Methods Summary

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

Methods Documentation

beta0(*wavelength*)

The propagation constant of the material.

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 angular frequency.

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 angular frequency.

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 permittivty of the desired material.

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

Returns
The permittivty at the target wavelength.

Return type
float, list

gvd(*wavelength*)

The group velocity dispersion (GVD) of the material.

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 of the material.

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 velocity of the material.

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*)

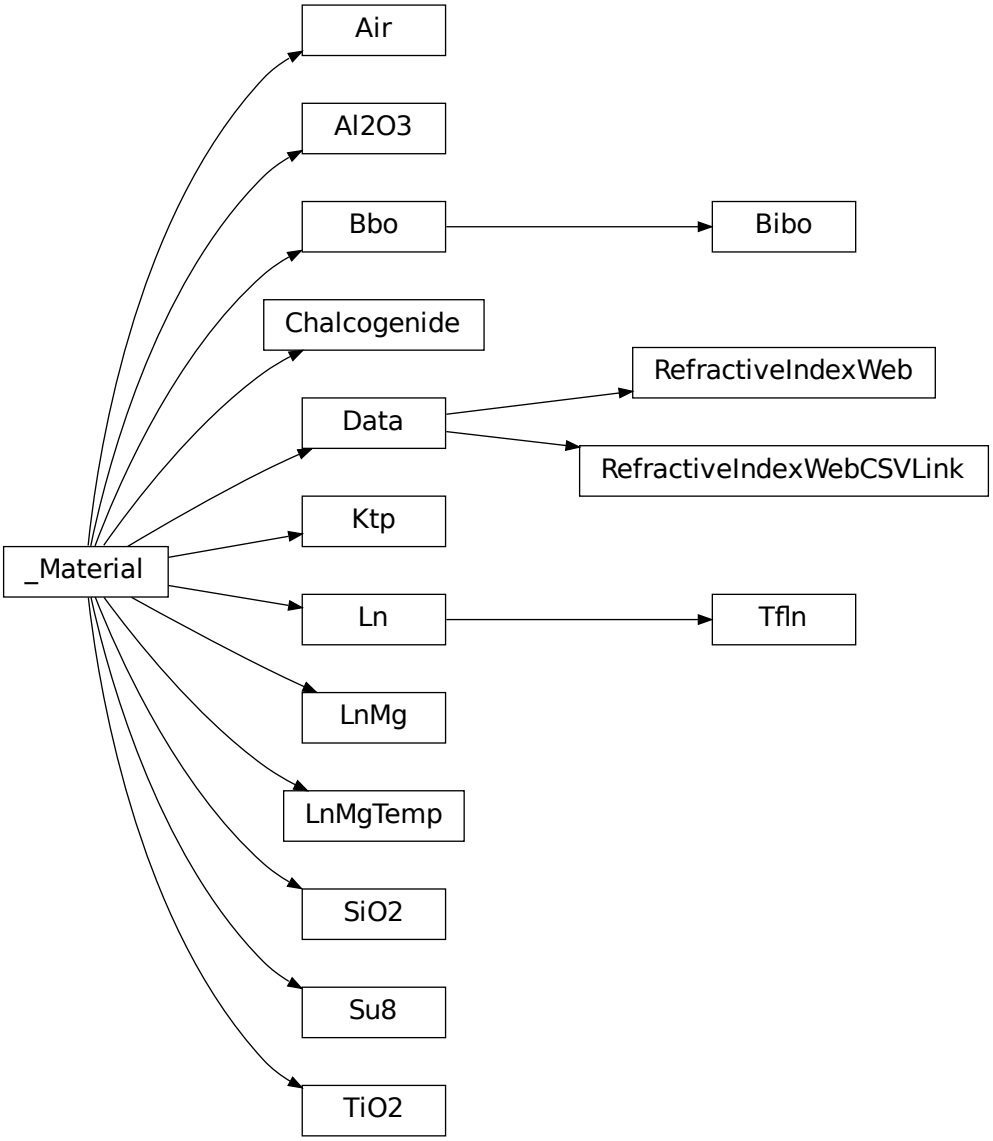
The wave impedance assuming the material is dielectric (not lossy or magnetic).

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



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