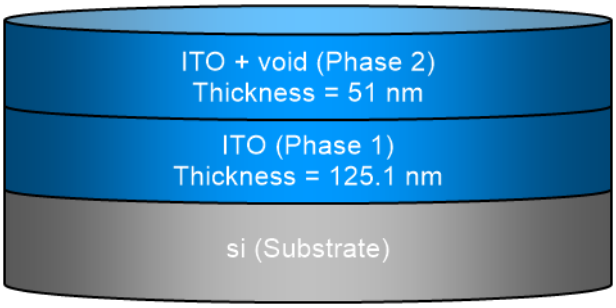
SEA regression report summary

Sample ID
001-e-int-ii 70° 1

Details	
Software and regression log	
Software about	Semilab - Spectroscopic Ellipsometry Analyzer - SEA
Software version	1.7.1
Officially licensed to	MIT
Operator	operator
Date and time of regression	14-07-2021 14:06
Comments	

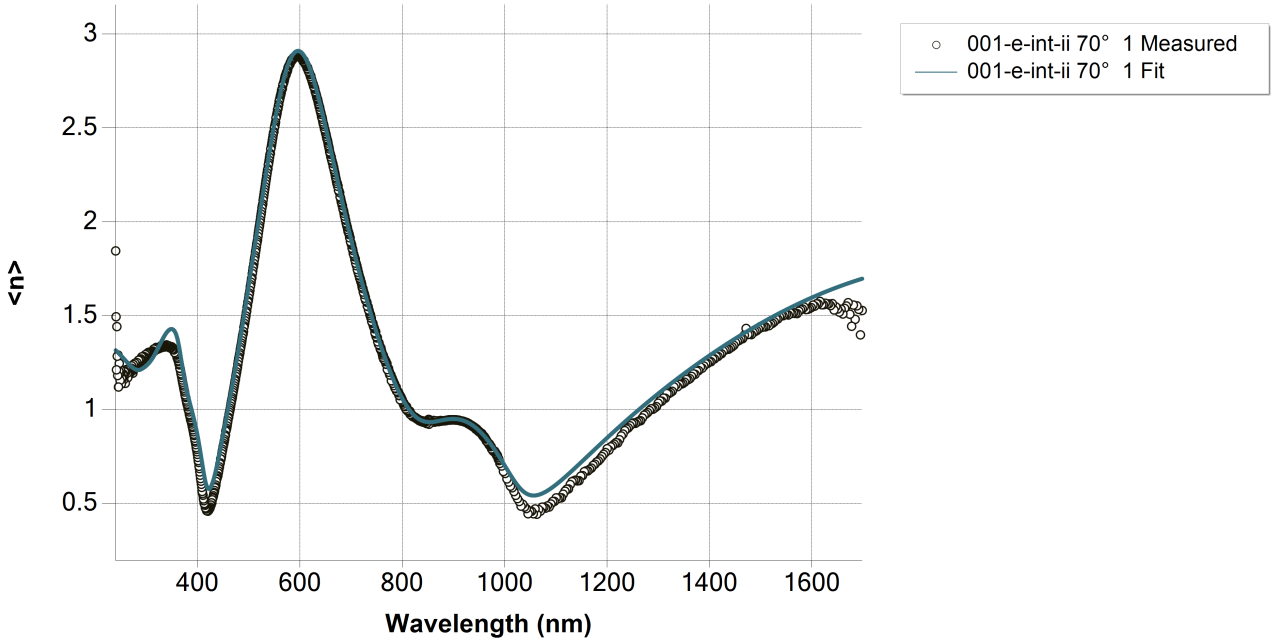
Layer structure	
Overview	
	
Optical model	
Phase 2	ITO + void
Diffusion	
Phase 1	ITO
Dispersion law	Tauc-Lorentz
	Drude
	Lorentz

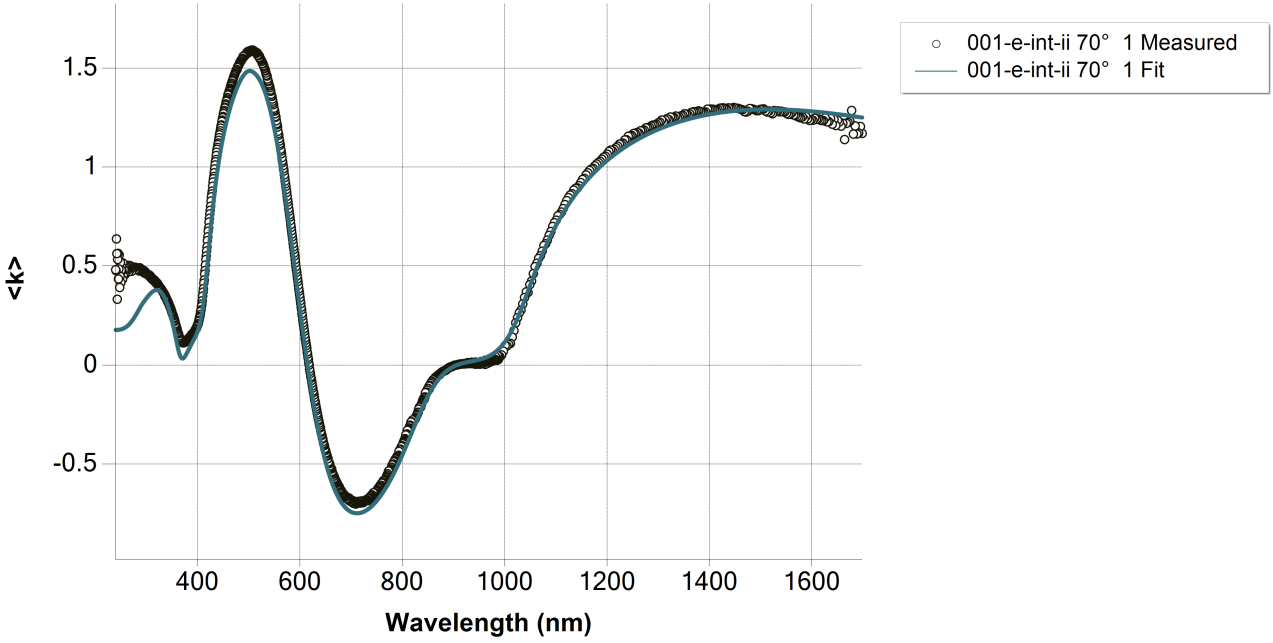
Regression results

Measurement information				
Measurement file path	C:\Users\emmabat\ito-si\001-e-int-ii.smdx			
Angle of Incidence	70°			
Regression details				
Regression 1 (EllipsoReflectance)				
Wavelength range	239.84 - 1698.83 nm			
Angle of Incidence	70°			
Fit to	<n>, <k>			
Angular Aperture	0°			
Fit algorithm	LMA			
Results				
Parameters	Value	Fitted	2 σ confidence limit	Unit
Model				
AOI Shift	0			°
Angular Aperture	0			°
Phase 2 (ITO + void)				
Thickness	50.994	X	0.35516	nm
Depolarization coefficient	0.33333			
Concentration 1	0.5			
Concentration 2	0.5			
Phase 1 (ITO)				
Thickness	125.112	X	1.02525	nm
A (eV)	499.9547			eV
E0 (eV)	6.0053			eV
C (eV)	57.2391	X	0.81786	eV
Eg (eV)	2.45146	X	0.029055	eV
E_p (eV)	1.12915	X	0.012948	eV
E_Γ (eV)	0.40533	X	0.023746	eV
f	0.17793	X	0.014301	
E0 (eV)	2.63764	X	0.049209	eV
Γ (eV)	1.0105	X	0.073103	eV
Eps_inf	0			
Derived parameters	Value			
Phase 2 (ITO + void)				
n @ 632.8 nm	1.4915			
k @ 632.8 nm	0.0275			
Phase 1 (ITO)				
n @ 632.8 nm	2.0394			
k @ 632.8 nm	0.0602			
Substrate (si)				
n @ 632.8 nm	3.8811			
k @ 632.8 nm	0.0195			
Drude derived parameters	Value			Unit
Phase 1 (ITO)				
Conductivity (S/m)	4.2314E+04 ± 3449.3782			S/m

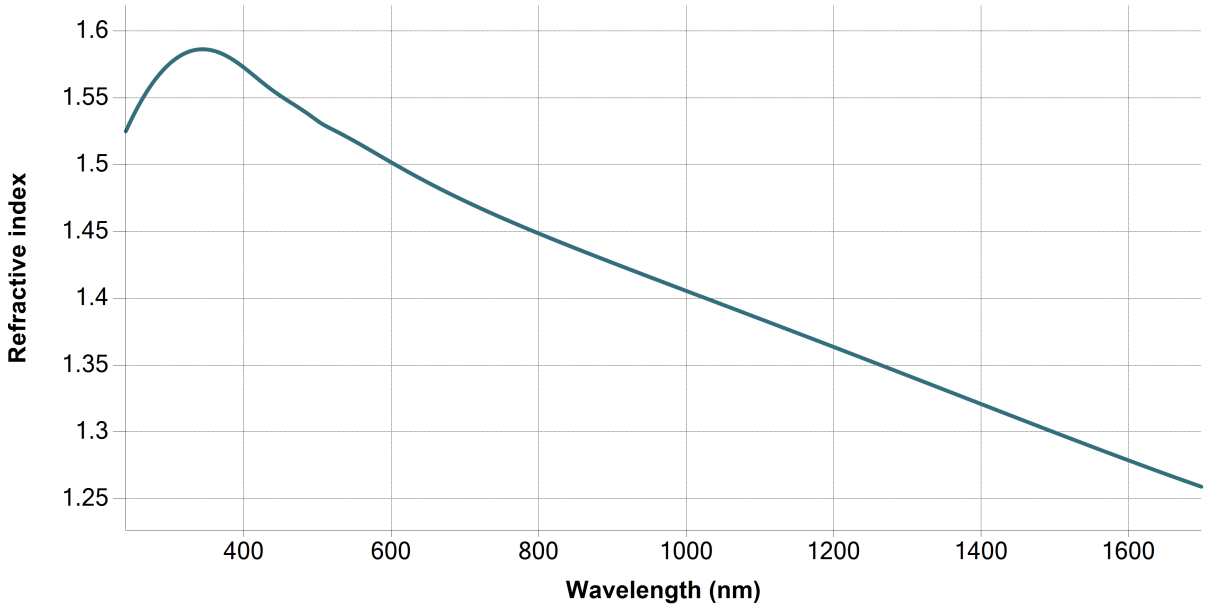
Resistivity (mΩ.cm)	2.3633 ± 0.1927	mΩ.cm
Resistance (Ω/sq)	188.8954 ± 16.9466	Ω/sq
N type dopant concentration (at/cm3)	2.3117E+20 ± 5.3017E+18	at/cm3
P type dopant concentration (at/cm3)	3.4213E+20 ± 7.8465E+18	at/cm3
N type dopant mobility (cm2/Vs)	11.4247 ± 0.9675	cm2/Vs
P type dopant mobility (cm2/Vs)	7.7194 ± 0.6537	cm2/Vs
Fit quality		
R^2	0.98861	
RMSE	0.07316	

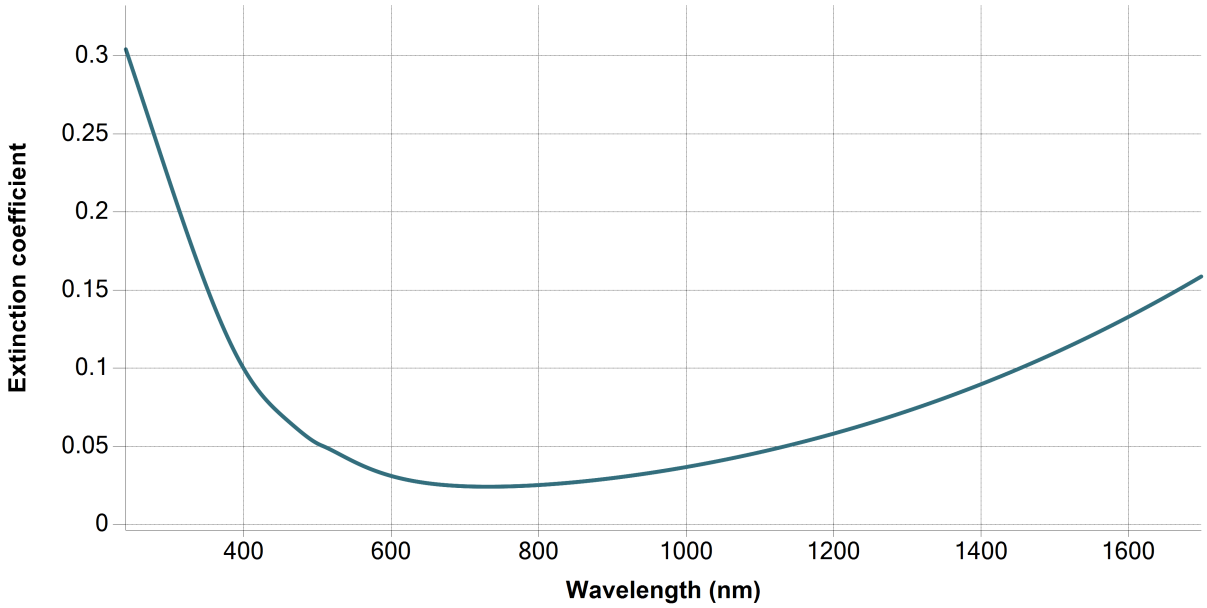
Regression graphs



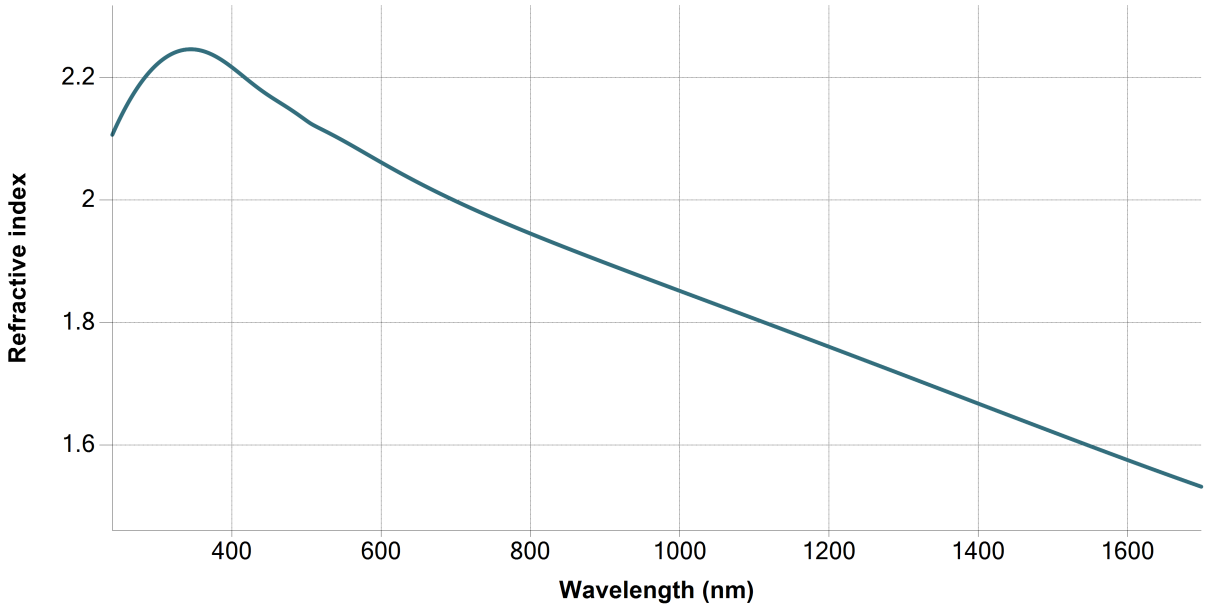


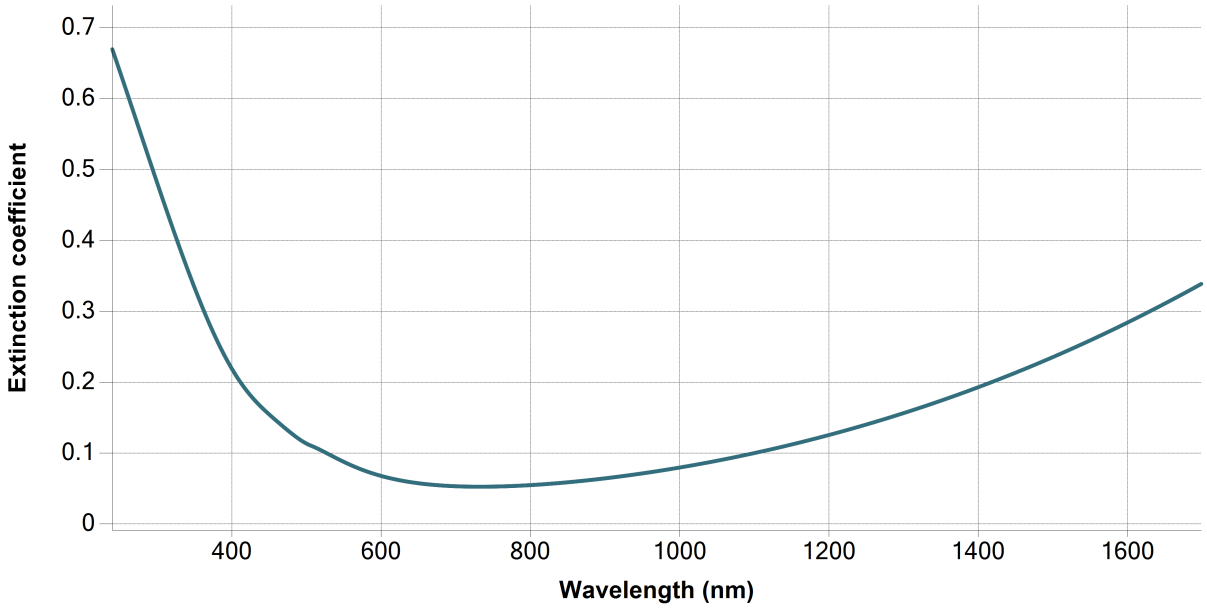
Phase 2 (ITO + void) - Dispersion graphs



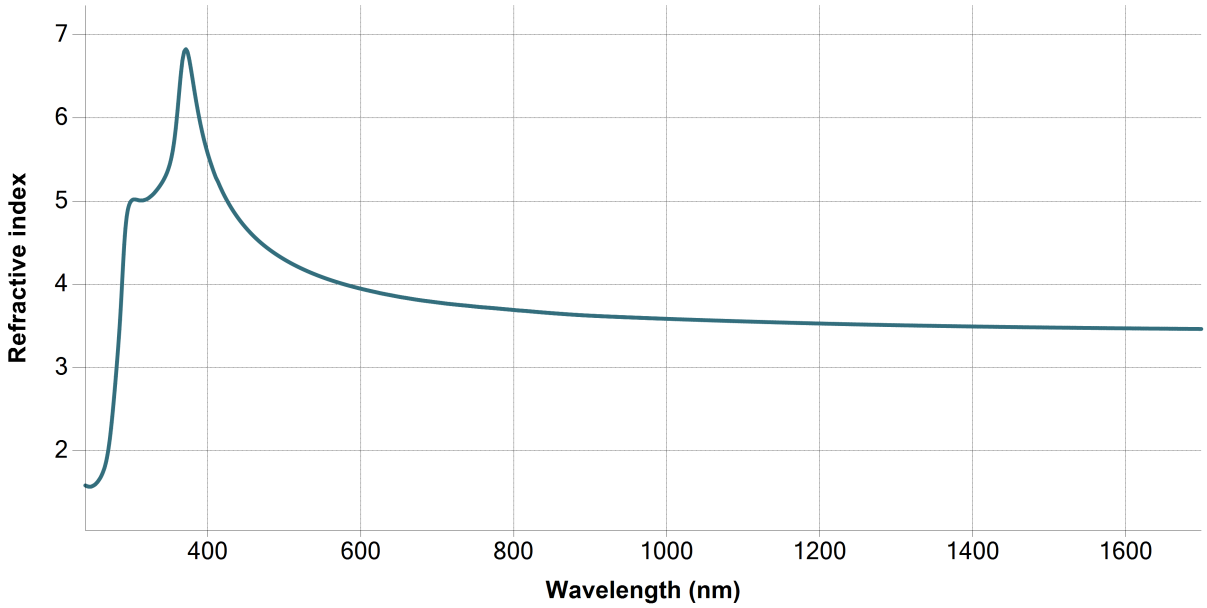


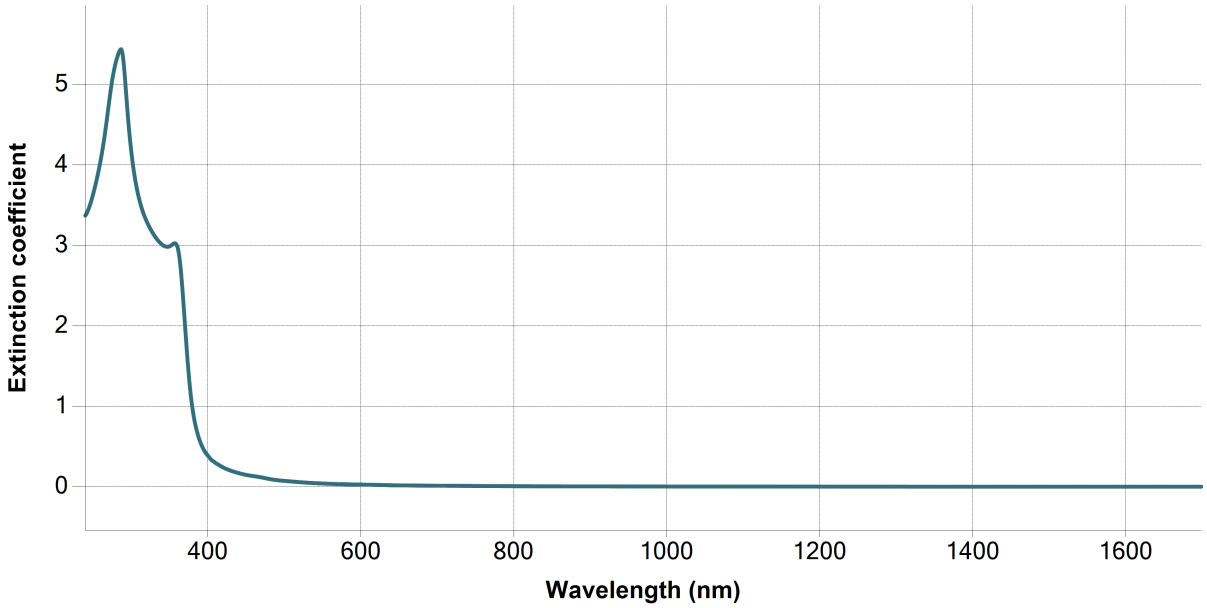
Phase 1 (ITO) - Dispersion graphs





Substrate (si) - Dispersion graphs





Correlation coefficients	
Ph2 - ITO + void - Thickness --- Ph1 - ITO - Thickness	-0.3171
Ph2 - ITO + void - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.1861
Ph2 - ITO + void - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.1673
Ph2 - ITO + void - Thickness --- Ph1 - Drude[2] - E_p (eV)	-0.3769
Ph2 - ITO + void - Thickness --- Ph1 - Drude[2] - E_Γ (eV)	0.0164
Ph2 - ITO + void - Thickness --- Ph1 - Lorentz[3] - f	-0.1257
Ph2 - ITO + void - Thickness --- Ph1 - Lorentz[3] - E0 (eV)	-0.0918
Ph1 - ITO - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.0237
Ph1 - ITO - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.5524
Ph1 - ITO - Thickness --- Ph1 - Drude[2] - E_p (eV)	0.4124
Ph1 - ITO - Thickness --- Ph1 - Drude[2] - E_Γ (eV)	0.445
Ph1 - ITO - Thickness --- Ph1 - Lorentz[3] - f	0.5382
Ph1 - ITO - Thickness --- Ph1 - Lorentz[3] - E0 (eV)	0.4816
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.7847
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Drude[2] - E_p (eV)	-0.4666
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Drude[2] - E_Γ (eV)	0.3642
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Lorentz[3] - f	-0.6321
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Lorentz[3] - E0 (eV)	-0.7137
Ph1 - Tauc-Lorentz[1] - Eg (eV) --- Ph1 - Drude[2] - E_p (eV)	0.4968
Ph1 - Tauc-Lorentz[1] - Eg (eV) --- Ph1 - Drude[2] - E_Γ (eV)	-0.0328
Ph1 - Tauc-Lorentz[1] - Eg (eV) --- Ph1 - Lorentz[3] - f	0.8999
Ph1 - Tauc-Lorentz[1] - Eg (eV) --- Ph1 - Lorentz[3] - E0 (eV)	0.9357
Ph1 - Drude[2] - E_p (eV) --- Ph1 - Drude[2] - E_Γ (eV)	0.0878
Ph1 - Drude[2] - E_p (eV) --- Ph1 - Lorentz[3] - f	0.3934
Ph1 - Drude[2] - E_p (eV) --- Ph1 - Lorentz[3] - E0 (eV)	0.3916
Ph1 - Drude[2] - E_Γ (eV) --- Ph1 - Lorentz[3] - f	-0.1716
Ph1 - Drude[2] - E_Γ (eV) --- Ph1 - Lorentz[3] - E0 (eV)	-0.0778
Ph1 - Lorentz[3] - f --- Ph1 - Lorentz[3] - E0 (eV)	0.9373