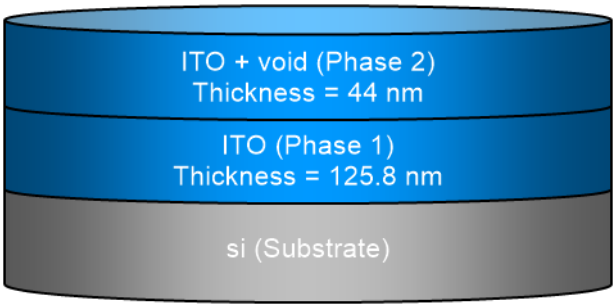
SEA regression report summary

Sample ID
001e-int-i 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 14:05
Comments	

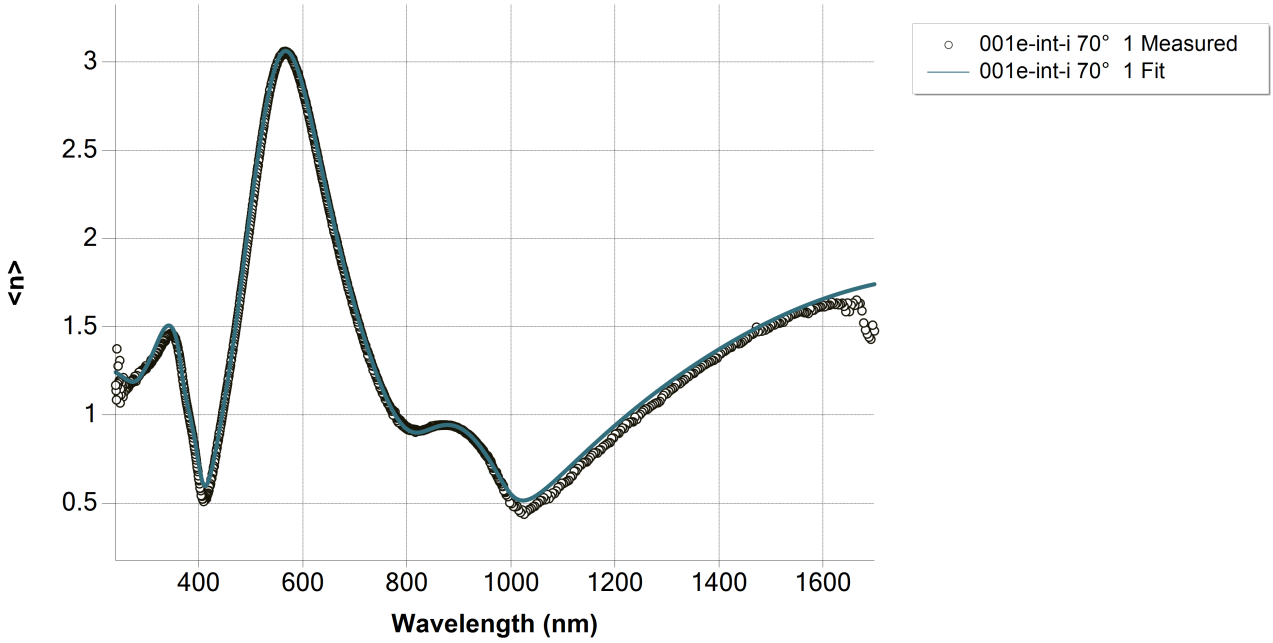
Layer structure	
Overview	
	
Optical model	
Phase 2	ITO + void
Diffusion	
Phase 1	ITO
Dispersion law	Tauc-Lorentz
	Drude
	Lorentz

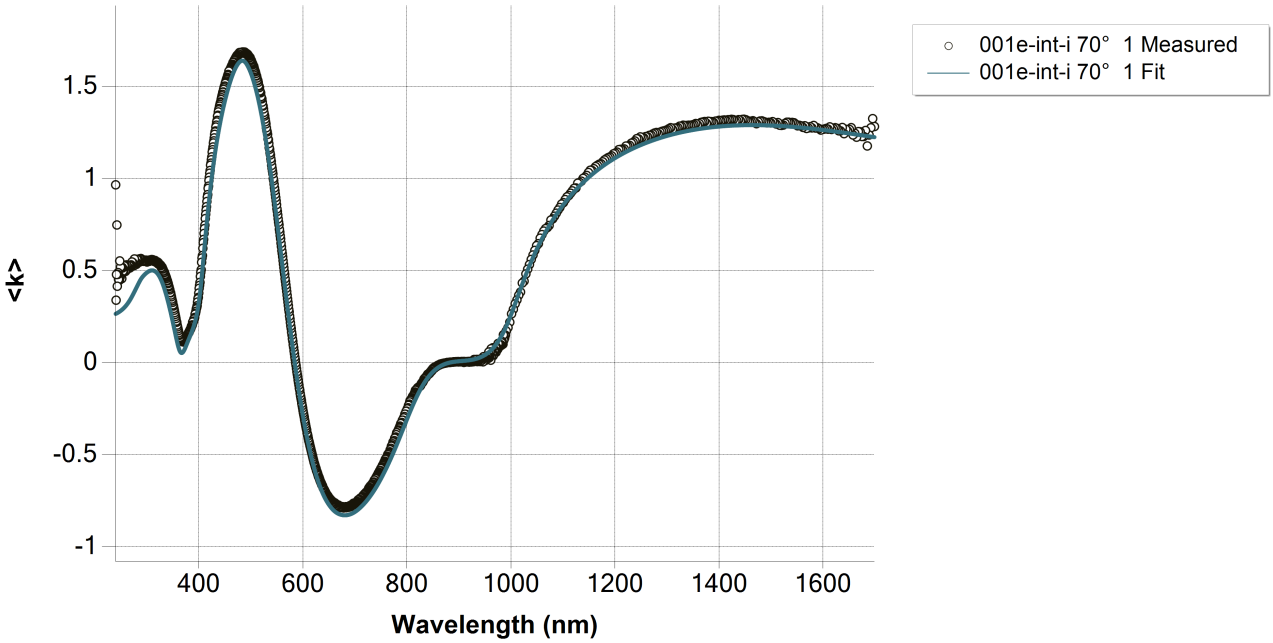
Regression results

Measurement information				
Measurement file path	C:\Users\emmabat\ito-si\001e-int-i.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	44.039	X	0.27244	nm
Depolarization coefficient	0.33333			
Concentration 1	0.5			
Concentration 2	0.5			
Phase 1 (ITO)				
Thickness	125.839	X	0.73897	nm
A (eV)	499.9547			eV
E0 (eV)	6.0053			eV
C (eV)	56.35877	X	0.64192	eV
Eg (eV)	2.51989	X	0.025488	eV
E_p (eV)	1.14766	X	0.0087536	eV
E_Γ (eV)	0.42362	X	0.018772	eV
f	0.14838	X	0.015792	
E0 (eV)	2.70255	X	0.082117	eV
Γ (eV)	1.3114	X	0.13246	eV
Eps_inf	0			
Derived parameters	Value			
Phase 2 (ITO + void)				
n @ 632.8 nm	1.4699			
k @ 632.8 nm	0.0253			
Phase 1 (ITO)				
n @ 632.8 nm	1.992			
k @ 632.8 nm	0.0553			
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)	4.1824E+04 ± 2491.3814			S/m

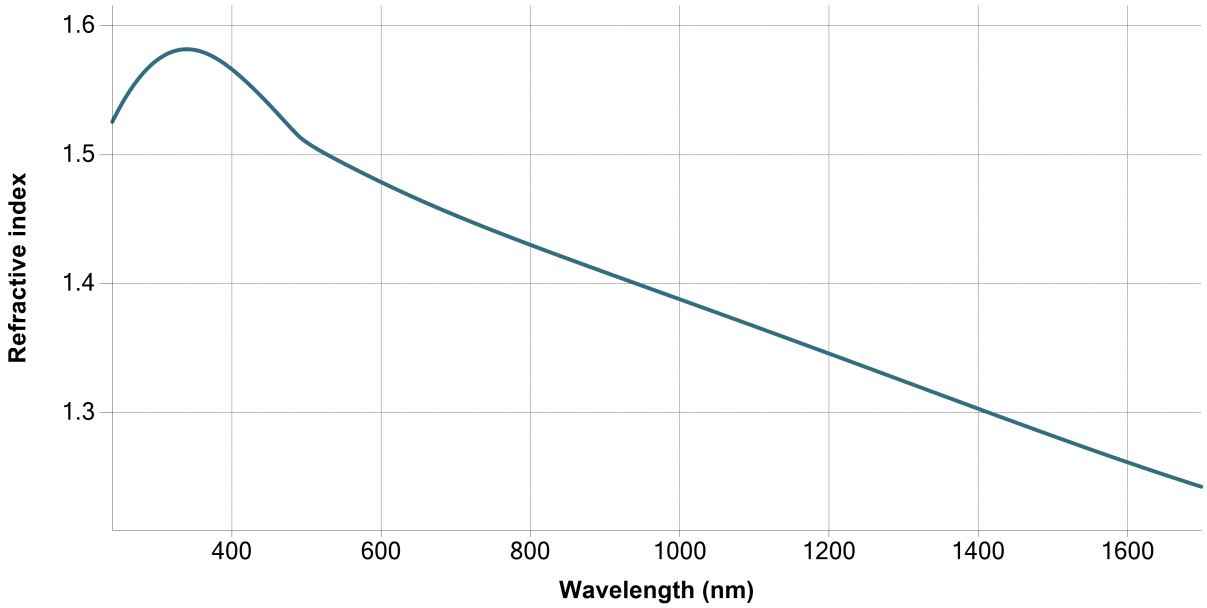
Resistivity (mΩ.cm)	2.3909 ± 0.1424	mΩ.cm
Resistance (Ω/sq)	190.0002 ± 12.4336	Ω/sq
N type dopant concentration (at/cm3)	2.3881E+20 ± 3.643E+18	at/cm3
P type dopant concentration (at/cm3)	3.5344E+20 ± 5.3916E+18	at/cm3
N type dopant mobility (cm2/Vs)	10.9312 ± 0.6722	cm2/Vs
P type dopant mobility (cm2/Vs)	7.3859 ± 0.4542	cm2/Vs
Fit quality		
R^2	0.99379	
RMSE	0.05722	

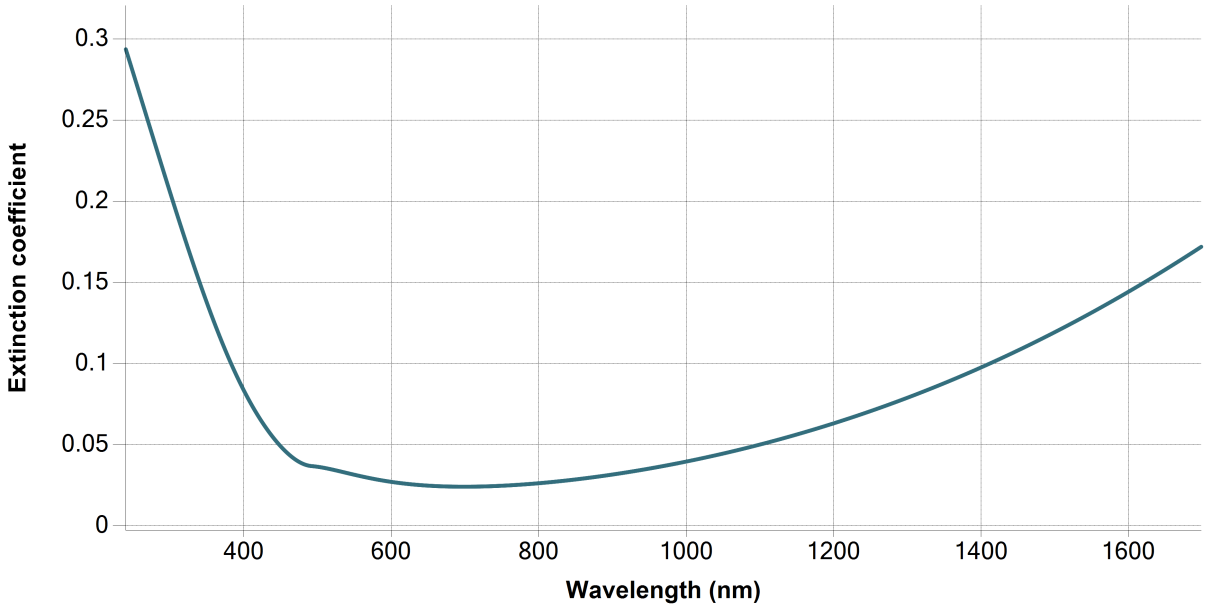
Regression graphs



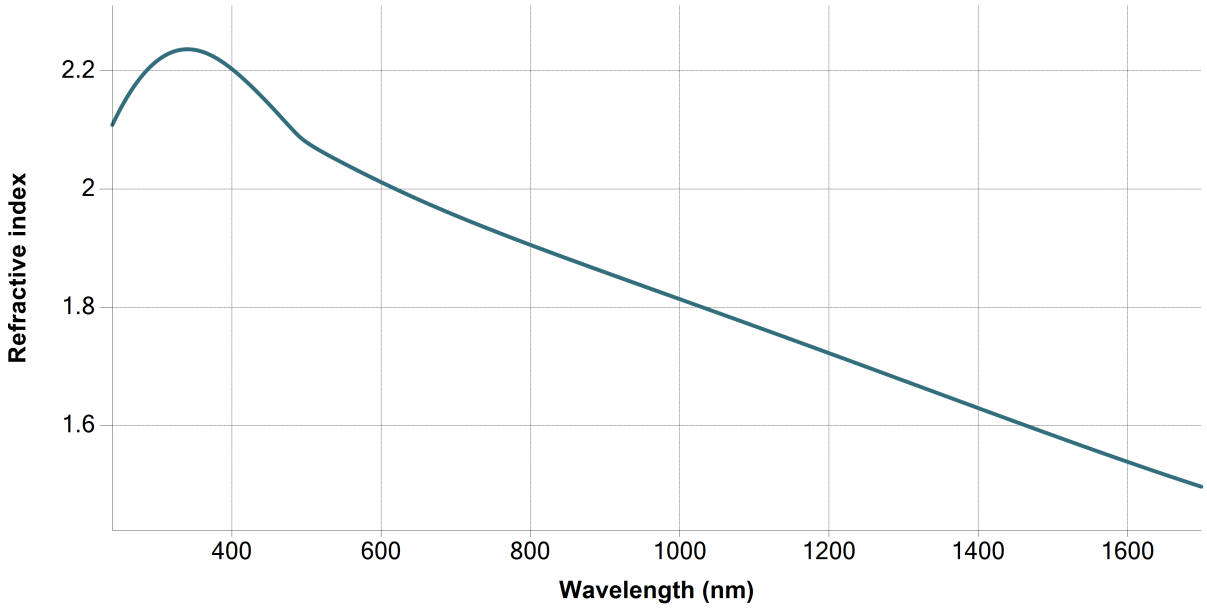


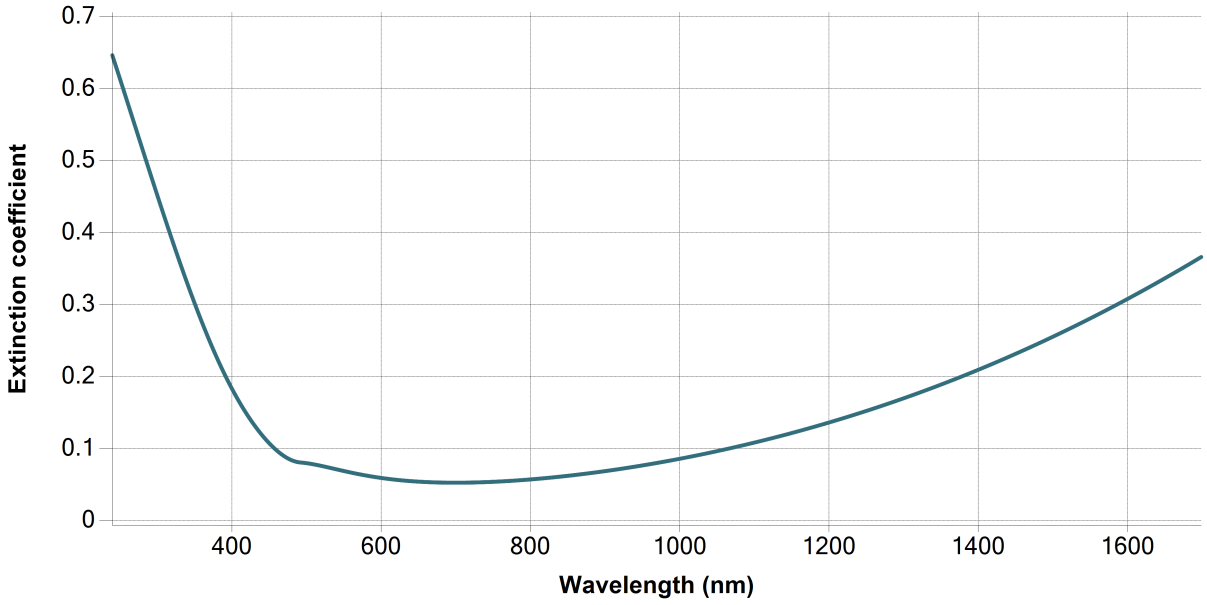
Phase 2 (ITO + void) - Dispersion graphs



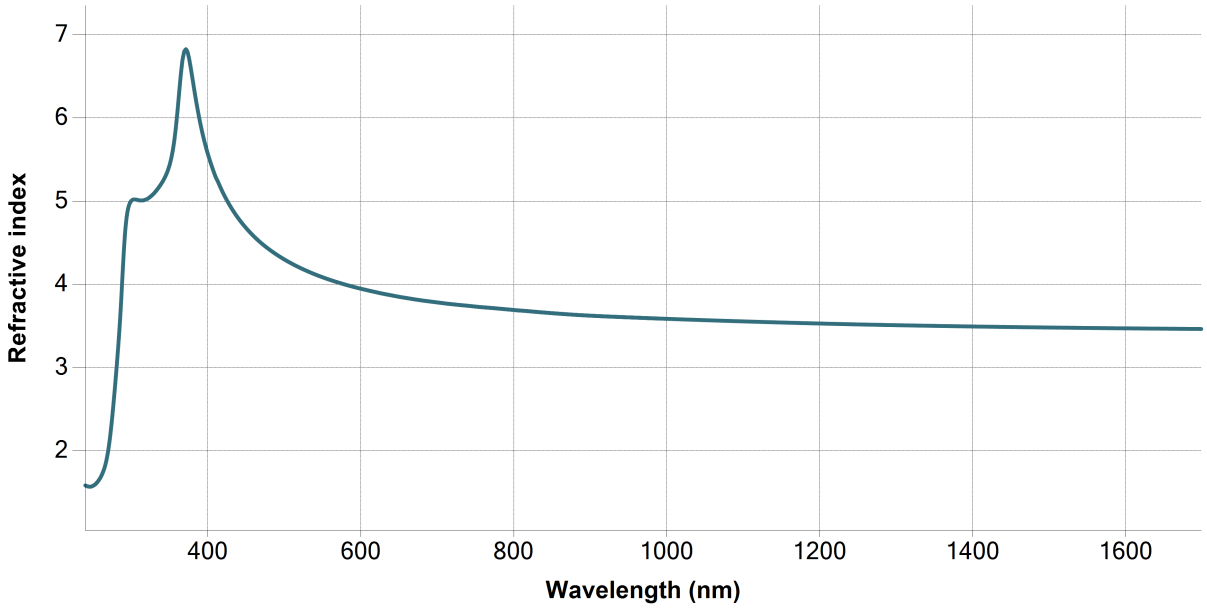


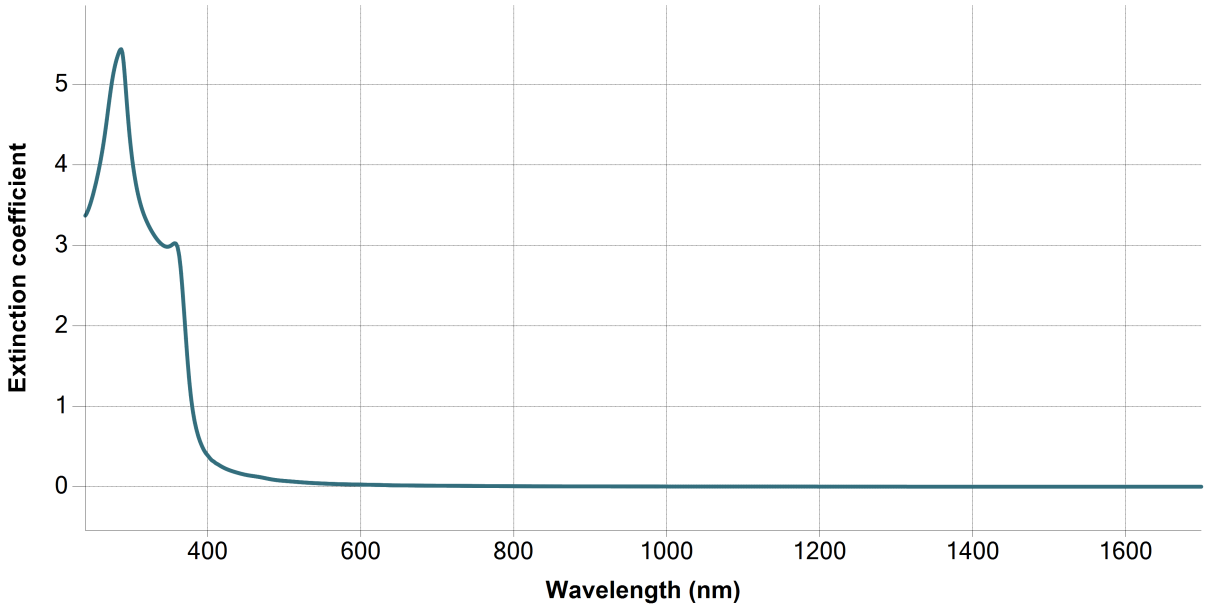
Phase 1 (ITO) - Dispersion graphs





Substrate (si) - Dispersion graphs





Correlation coefficients	
Ph2 - ITO + void - Thickness --- Ph1 - ITO - Thickness	-0.4129
Ph2 - ITO + void - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.1718
Ph2 - ITO + void - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.2134
Ph2 - ITO + void - Thickness --- Ph1 - Drude[2] - E_p (eV)	-0.3635
Ph2 - ITO + void - Thickness --- Ph1 - Drude[2] - E_Γ (eV)	0.0242
Ph2 - ITO + void - Thickness --- Ph1 - Lorentz[3] - f	-0.1869
Ph2 - ITO + void - Thickness --- Ph1 - Lorentz[3] - E0 (eV)	-0.1549
Ph1 - ITO - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.0325
Ph1 - ITO - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.5457
Ph1 - ITO - Thickness --- Ph1 - Drude[2] - E_p (eV)	0.3295
Ph1 - ITO - Thickness --- Ph1 - Drude[2] - E_Γ (eV)	0.2859
Ph1 - ITO - Thickness --- Ph1 - Lorentz[3] - f	0.5457
Ph1 - ITO - Thickness --- Ph1 - Lorentz[3] - E0 (eV)	0.4986
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.8245
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Drude[2] - E_p (eV)	-0.4295
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Drude[2] - E_Γ (eV)	0.4812
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Lorentz[3] - f	-0.7094
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Lorentz[3] - E0 (eV)	-0.7641
Ph1 - Tauc-Lorentz[1] - Eg (eV) --- Ph1 - Drude[2] - E_p (eV)	0.4028
Ph1 - Tauc-Lorentz[1] - Eg (eV) --- Ph1 - Drude[2] - E_Γ (eV)	-0.2442
Ph1 - Tauc-Lorentz[1] - Eg (eV) --- Ph1 - Lorentz[3] - f	0.9321
Ph1 - Tauc-Lorentz[1] - Eg (eV) --- Ph1 - Lorentz[3] - E0 (eV)	0.9576
Ph1 - Drude[2] - E_p (eV) --- Ph1 - Drude[2] - E_Γ (eV)	-0.0058
Ph1 - Drude[2] - E_p (eV) --- Ph1 - Lorentz[3] - f	0.314
Ph1 - Drude[2] - E_p (eV) --- Ph1 - Lorentz[3] - E0 (eV)	0.3129
Ph1 - Drude[2] - E_Γ (eV) --- Ph1 - Lorentz[3] - f	-0.3625
Ph1 - Drude[2] - E_Γ (eV) --- Ph1 - Lorentz[3] - E0 (eV)	-0.2774
Ph1 - Lorentz[3] - f --- Ph1 - Lorentz[3] - E0 (eV)	0.9645