SEA regression report summary

Sample ID
001f-int-i 70° 1
001f-int-i 65° 2
001f-int-i 60° 3

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	26-08-2021 16:07
Comments	

Layer structure	
Overview	

Optical model	
Phase 2	InSn-Nanoparticles
Dispersion law	Lorentz
	Lorentz
Phase 1	Bulovic-ITO_tld
Dispersion law	Tauc-Lorentz
	Drude

Regression results

Measurement information	
Measurement 1	
Measurement file path	C:\Users\emmabat\ito-si\001f-int-i.smdx
Angle of Incidence	70°
Measurement 2	
Measurement file path	C:\Users\emmabat\ito-si\001f-int-i.smdx
Angle of Incidence	65°
Measurement 3	
Measurement file path	C:\Users\emmabat\ito-si\001f-int-i.smdx
Angle of Incidence	60°
Regression details	
Regression 1 (EllipsoReflectance)	
Wavelength range	239.84 - 1698.83 nm
Angle of Incidence	70°
Fit to	<n>, <k>
Regression 2 (EllipsoReflectance)	
Wavelength range	239.84 - 1698.83 nm
Angle of Incidence	65°
Fit to	<n>, <k>
Regression 3 (EllipsoReflectance)	
Wavelength range	239.84 - 1698.83 nm
Angle of Incidence	60°
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 (InSn-Nanoparticles)				
Thickness	75.65	X	0.67605	nm
f	0.43093	X	0.019506	
E0 (eV)	3.87962	X	0.016991	eV
Γ (eV)	1.17942	X	0.052556	eV
f	0.74411	X	0.022803	
E0 (eV)	6.0297	X	0.041566	eV
Γ (eV)	1.20135	X	0.10965	eV
Eps_inf	0			
Phase 1 (Bulovic-ITO_tld)				
Thickness	135.28	X	0.37525	nm
A (eV)	62.57344	X	3.81731	eV
E0 (eV)	7.09298	X	0.3162	eV
C (eV)	7.5445	X	1.05634	eV
Eg (eV)	1.60783	X	0.026743	eV

| E_p (eV)	0.56155	X	0.018825	eV
E_Γ (eV)	0			eV
Eps_inf	0			
Derived parameters	Value			
Phase 2 (InSn-Nanoparticles)				
n @ 632.8 nm	1.1781			
k @ 632.8 nm	0.074			
Phase 1 (Bulovic-ITO_tld)				
n @ 632.8 nm	1.9894			
k @ 632.8 nm	0.0223			
Substrate (si)				
n @ 632.8 nm	3.8811			
k @ 632.8 nm	0.0195			
Drude derived parameters	Value			Unit
Phase 1 (Bulovic-ITO_tld)				
Conductivity (S/m)	∞ ± NaN			S/m
Resistivity (mΩ.cm)	0 ± NaN			mΩ.cm
Resistance (Ω/sq)	0 ± NaN			Ω/sq
N type dopant concentration (at/cm3)	5.7174E+19 ± 3.8333E+18			at/cm3
P type dopant concentration (at/cm3)	8.4617E+19 ± 5.6734E+18			at/cm3
N type dopant mobility (cm2/Vs)	∞ ± NaN			cm2/Vs
P type dopant mobility (cm2/Vs)	∞ ± NaN			cm2/Vs
Fit quality				
R^2	0.9905			
RMSE	0.06696			

Regression graphs
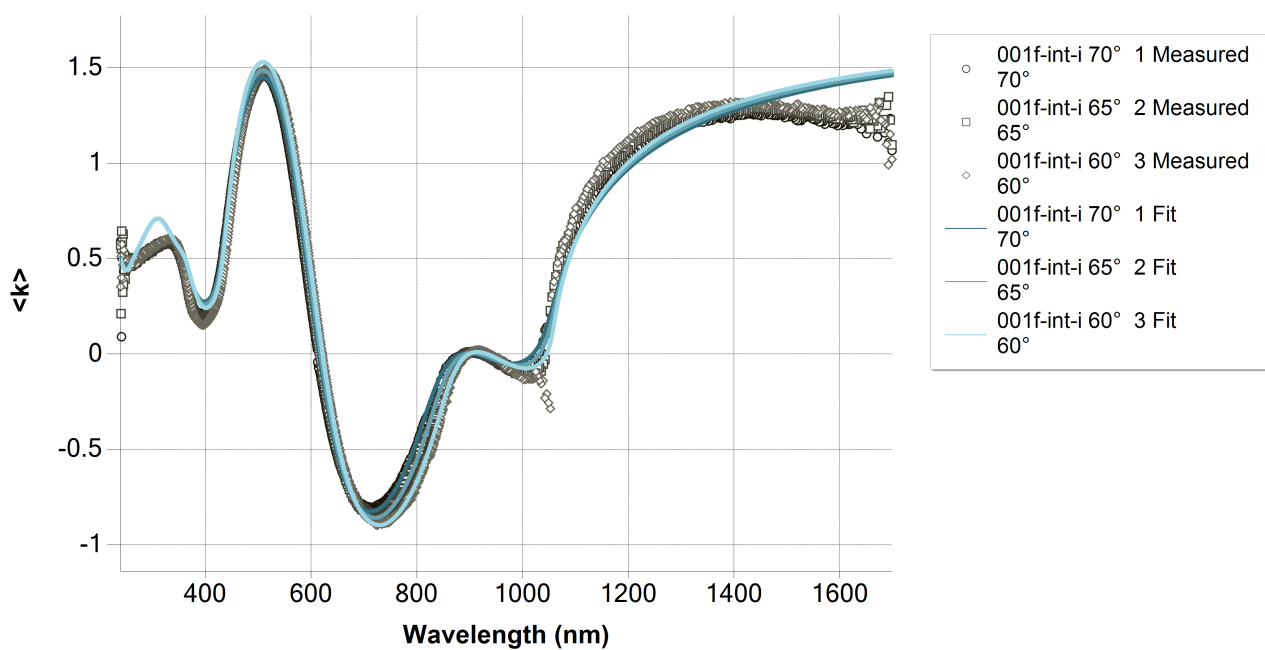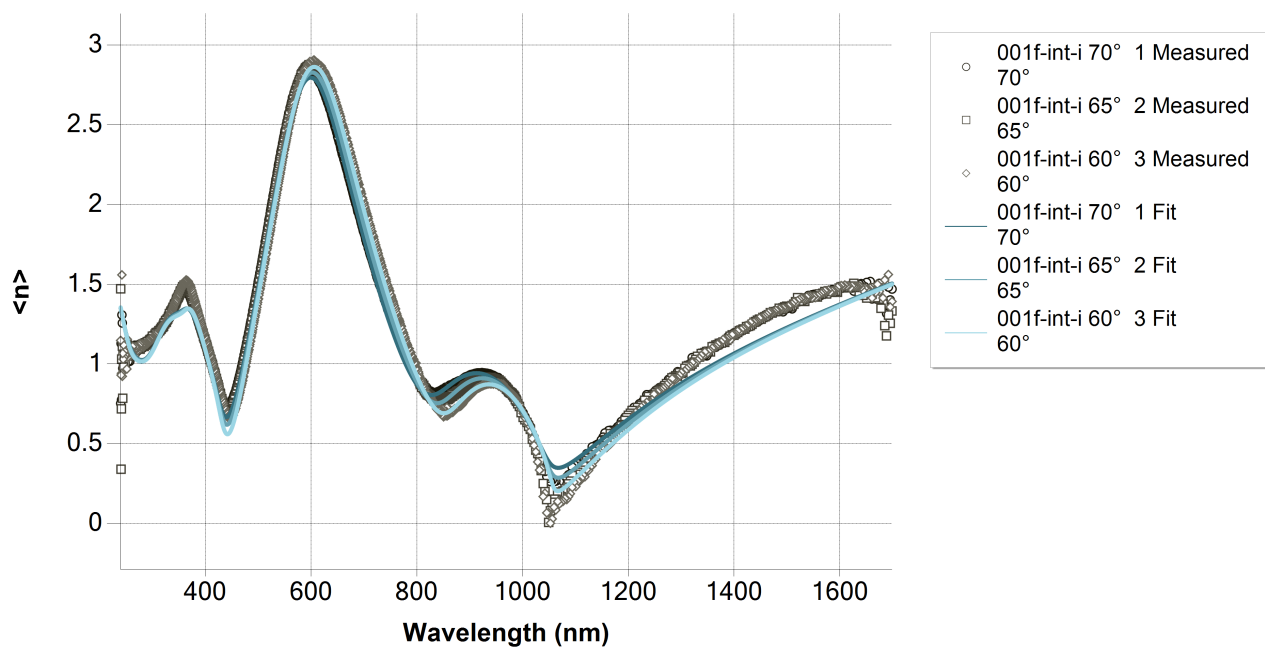
Phase 2 (InSn-Nanoparticles) - Dispersion graphs
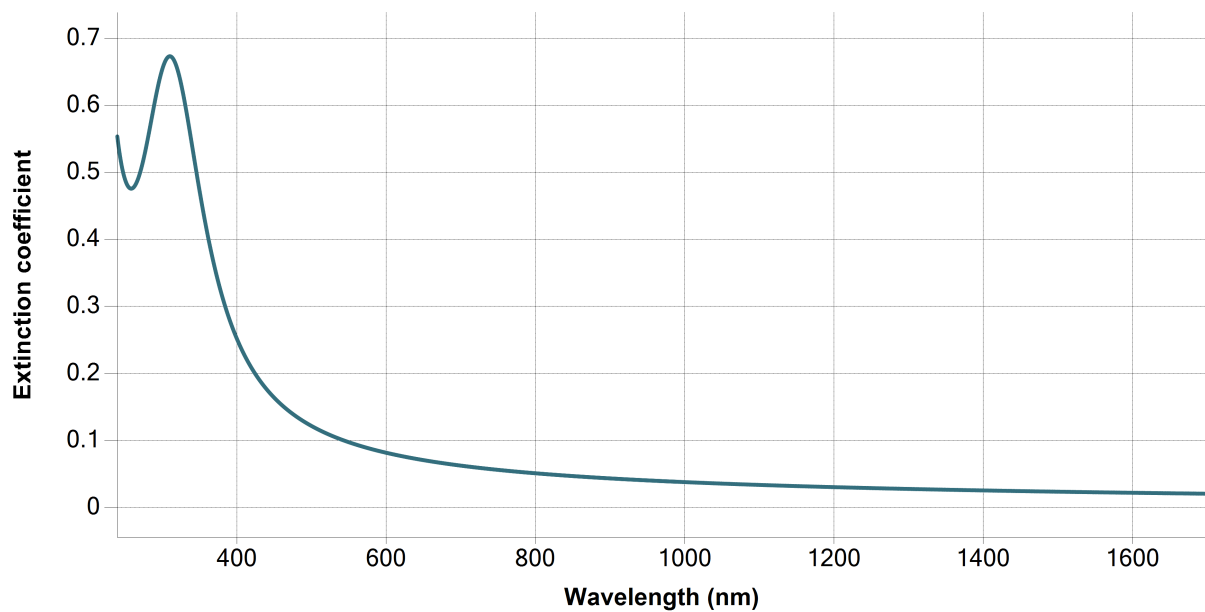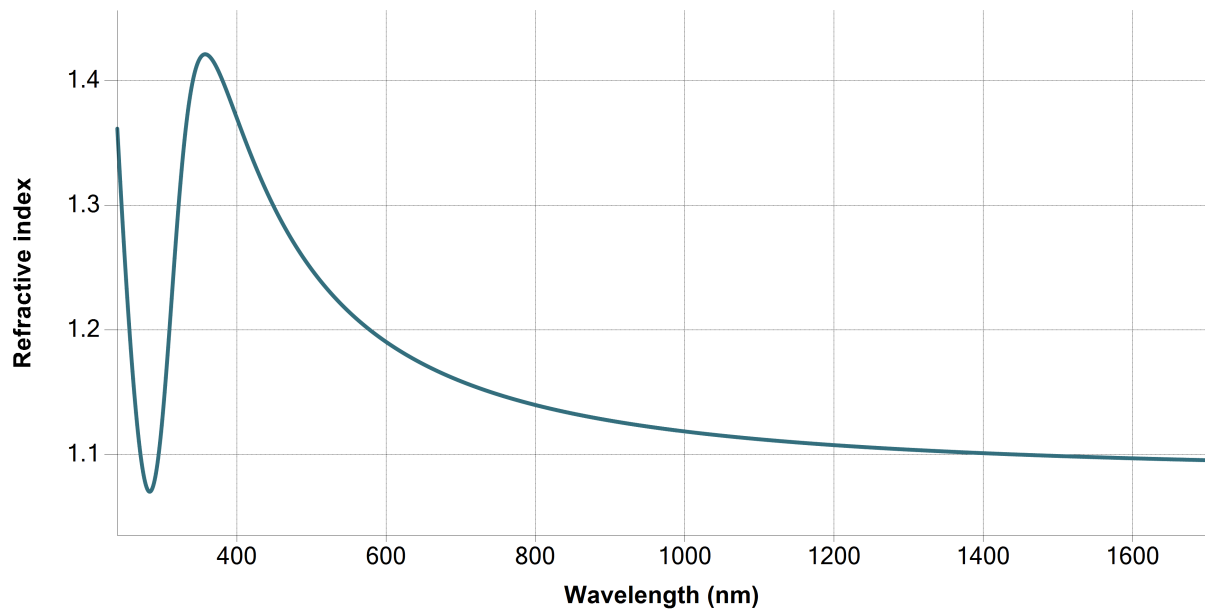
Phase 1 (Bulovic-ITO_tld) - Dispersion graphs
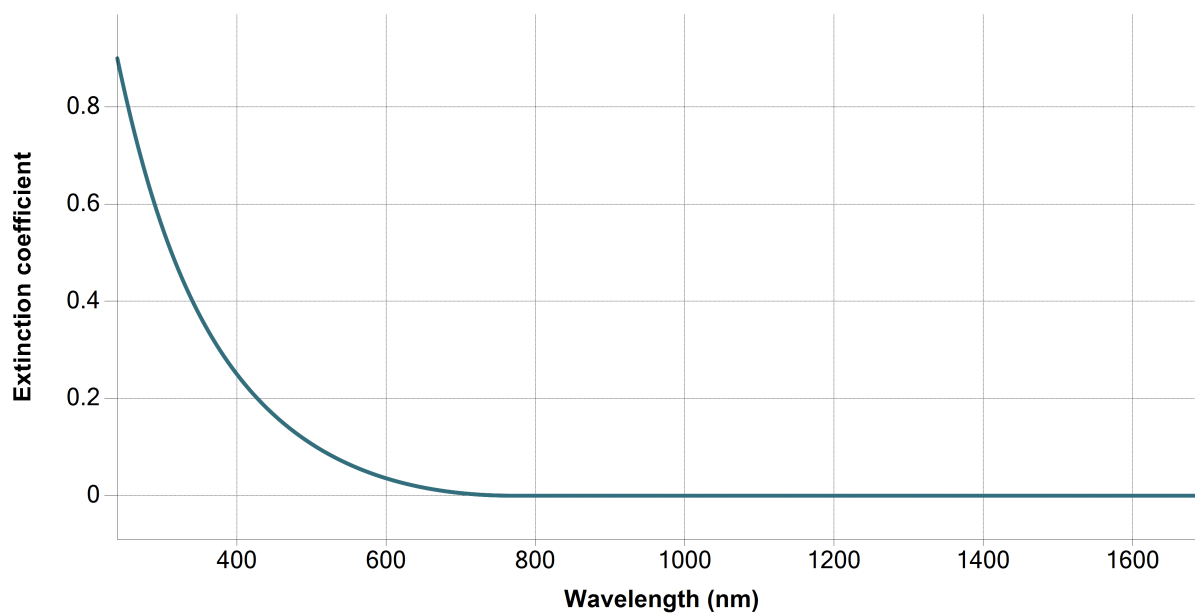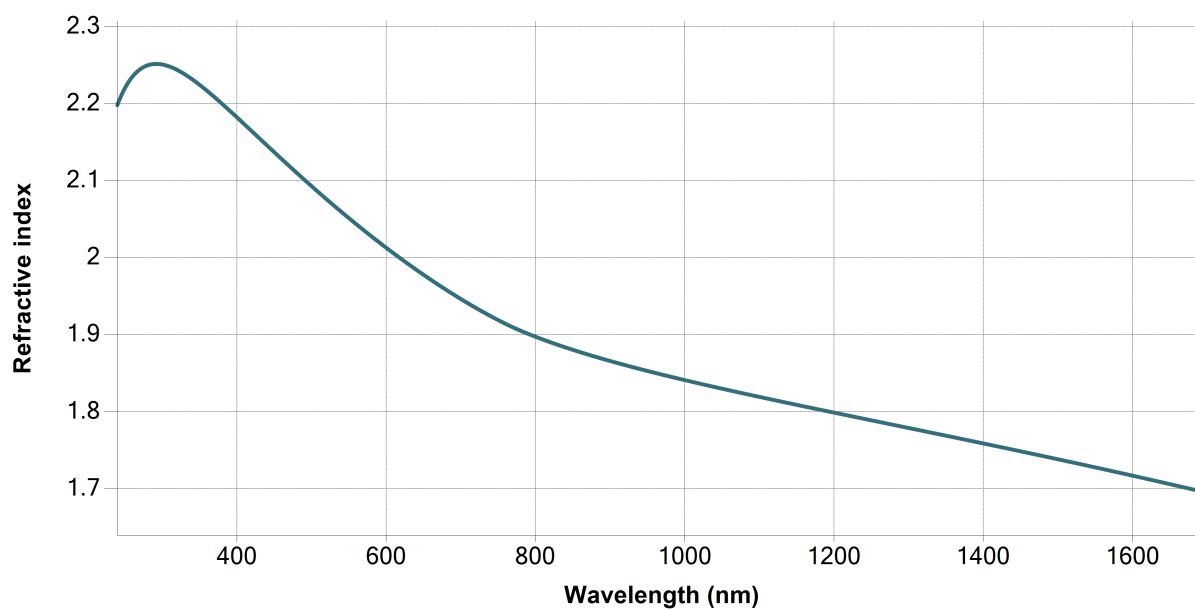
Substrate (si) - Dispersion graphs

Correlation coefficients	
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - f	0.2368
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - E0 (eV)	0.149
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - Γ (eV)	0.3519
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - f	-0.4969
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - E0 (eV)	-0.2336
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - Γ (eV)	-0.2311
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Bulovic-ITO_tld - Thickness	0.4791
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.5416
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.5795
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.5588
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.4405
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[1] - E0 (eV)	0.7325
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[1] - Γ (eV)	0.8842
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - f	-0.8958
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - E0 (eV)	-0.6145
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - Γ (eV)	-0.9206
Ph2 - Lorentz[1] - f --- Ph1 - Bulovic-ITO_tld - Thickness	-0.0427
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.4286
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.534
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.4242
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.3905
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[1] - Γ (eV)	0.707
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - f	-0.6875
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - E0 (eV)	-0.4459
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - Γ (eV)	-0.6756
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	0.1
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.0411
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.1046
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.017
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.1042
Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - f	-0.7569
Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - E0 (eV)	-0.435
Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - Γ (eV)	-0.7524
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	-0.0628
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.5101
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.5928
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.4699
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.5654
Ph2 - Lorentz[2] - f --- Ph2 - Lorentz[2] - E0 (eV)	0.7537
Ph2 - Lorentz[2] - f --- Ph2 - Lorentz[2] - Γ (eV)	0.9117

Ph2 - Lorentz[2] - f --- Ph1 - Bulovic-ITO_tld - Thickness	-0.3336
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.4109
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	-0.5257
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.4299
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.2995
Ph2 - Lorentz[2] - E0 (eV) --- Ph2 - Lorentz[2] - Γ (eV)	0.7651
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	-0.3338
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.1588
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	-0.2691
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.1951
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.023
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	-0.11
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.2916
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	-0.4151
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.3159
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.1825
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.0445
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.0387
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.0173
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.1842
Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.9555
Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.9884
Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.9047
Ph1 - Tauc-Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.9693
Ph1 - Tauc-Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.7928
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.834