SEA regression report summary

Sample ID
001b-int-i 70° 1
001b-int-i 65° 2
001b-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 15:41
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\001b-int-i.smdx
Angle of Incidence	70°
Measurement 2	
Measurement file path	C:\Users\emmabat\ito-si\001b-int-i.smdx
Angle of Incidence	65°
Measurement 3	
Measurement file path	C:\Users\emmabat\ito-si\001b-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	75.613	X	0.51563	nm
f	0.49471	X	0.016959	
E0 (eV)	3.94483	X	0.021914	eV
Γ (eV)	1.44802	X	0.044347	eV
f	0.69205	X	0.019028	
E0 (eV)	6.06434	X	0.04015	eV
Γ (eV)	0.90864	X	0.092248	eV
Eps_inf	0			
Phase 1 (Bulovic-ITO_tld)				
Thickness	134.213	X	0.32846	nm
A (eV)	67.41514	X	3.36281	eV
E0 (eV)	7.9072	X	0.28208	eV
C (eV)	7.56548	X	0.90795	eV
Eg (eV)	1.72384	X	0.030007	eV

E_p (eV)	0.70577	X	0.011141	eV
E_Γ (eV)	0			eV
Eps_inf	0			
Derived parameters	Value			
Phase 2 (InSn-Nanoparticles)				
n @ 632.8 nm	1.1821			
k @ 632.8 nm	0.0811			
Phase 1 (Bulovic-ITO_tld)				
n @ 632.8 nm	1.9724			
k @ 632.8 nm	0.0079			
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)	9.0312E+19 ± 2.8512E+18	at/cm3
P type dopant concentration (at/cm3)	1.3366E+20 ± 4.2198E+18	at/cm3
N type dopant mobility (cm2/Vs)	∞ ± NaN	cm2/Vs
P type dopant mobility (cm2/Vs)	∞ ± NaN	cm2/Vs

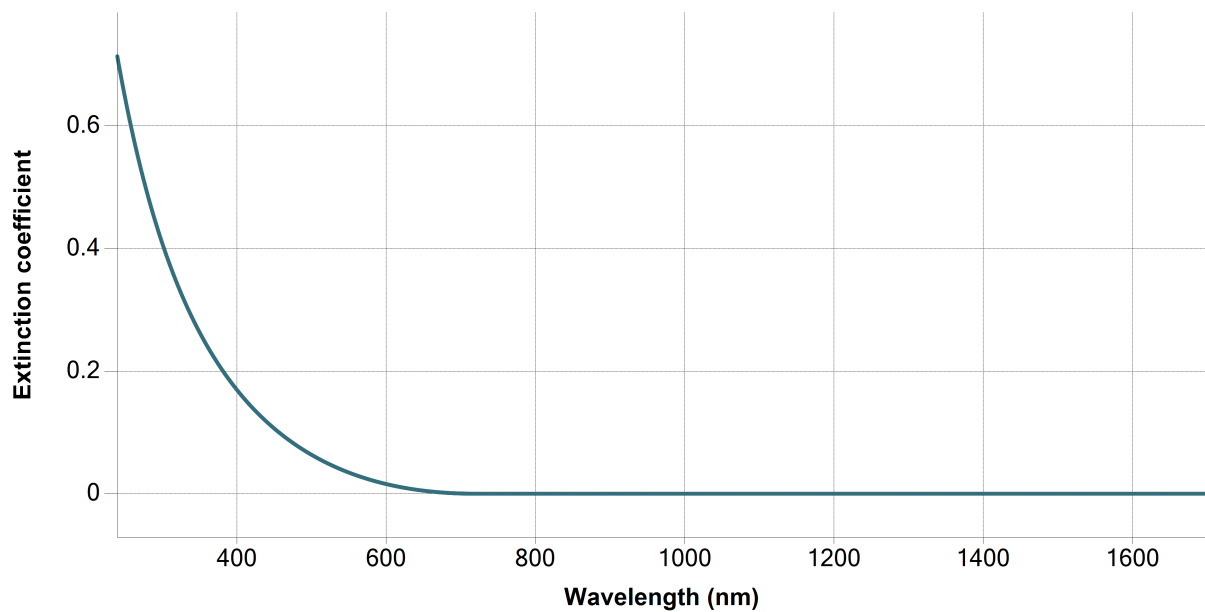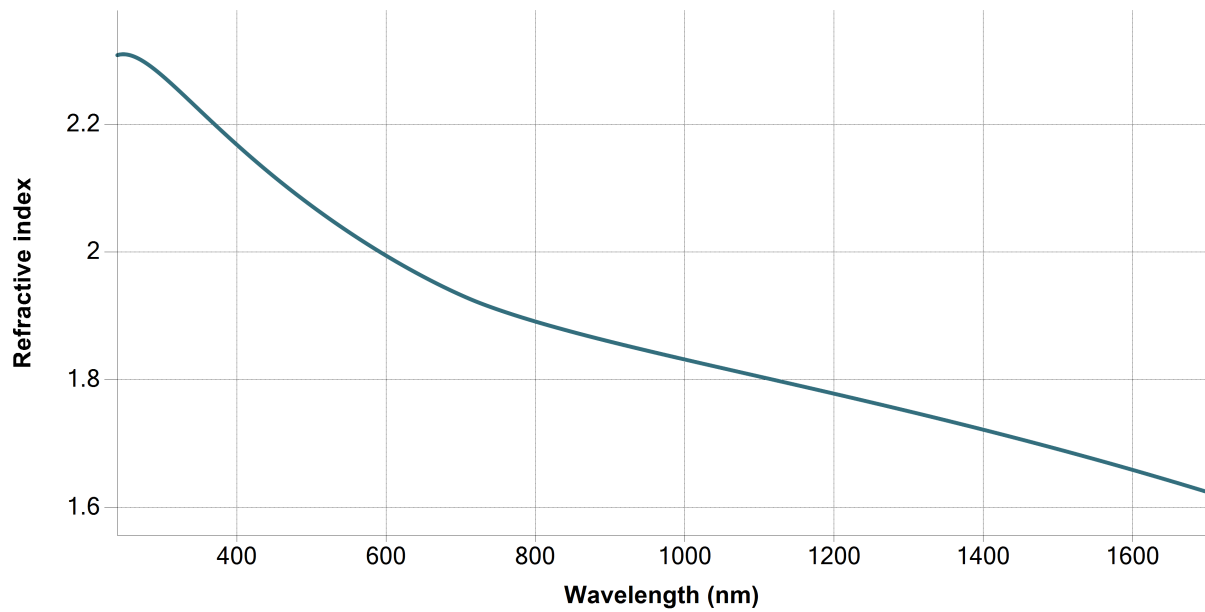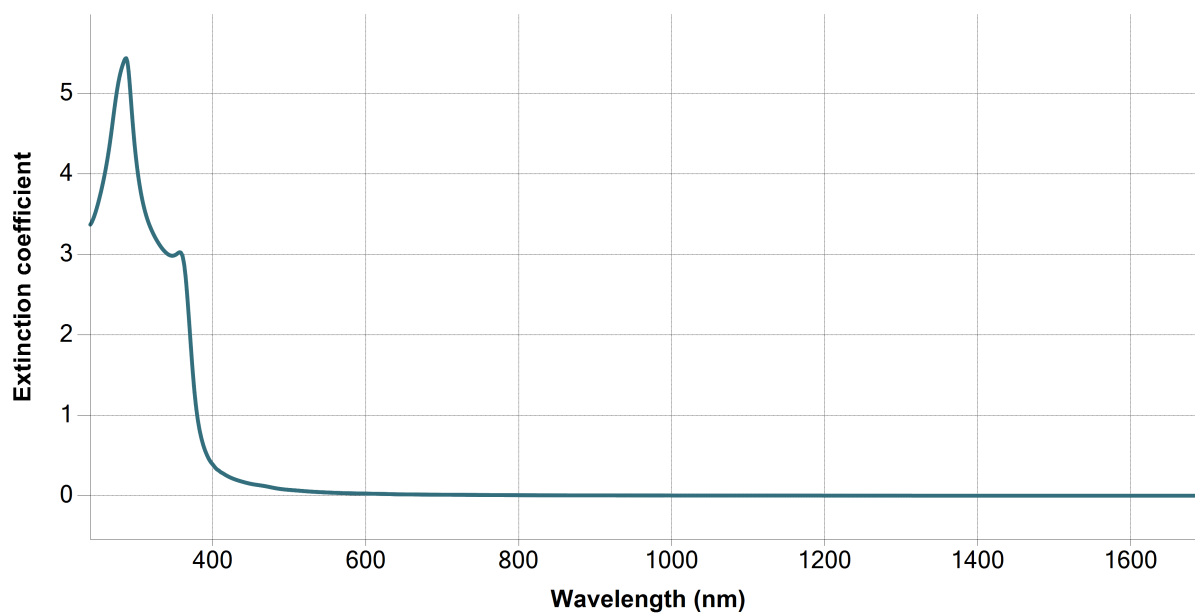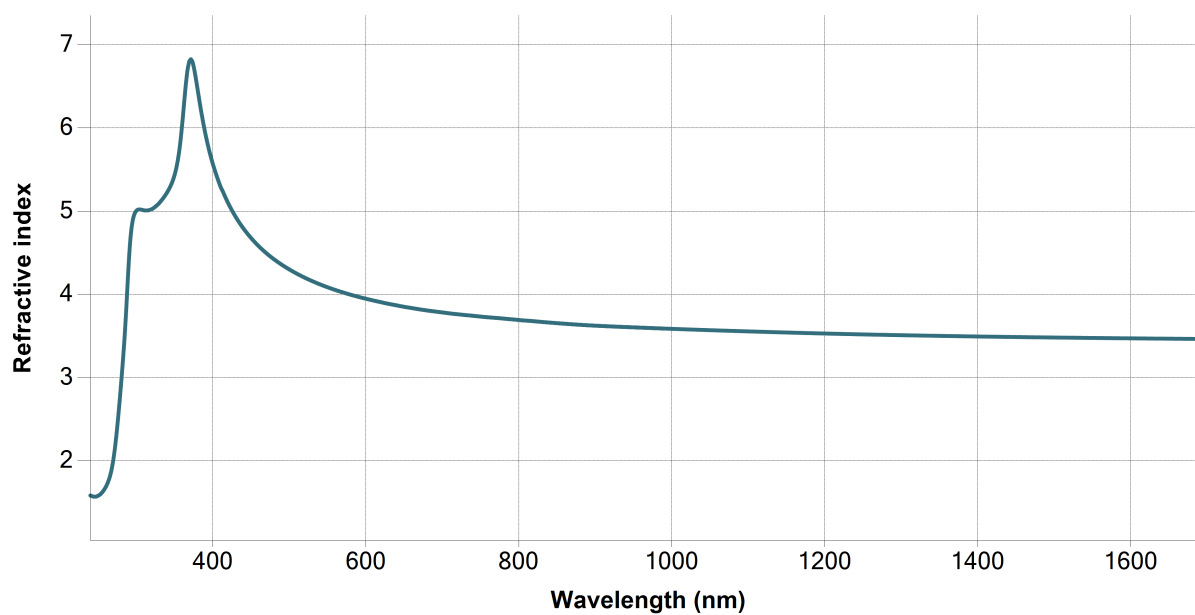| **Fit quality**	
R^2	0.99242
RMSE	0.06129

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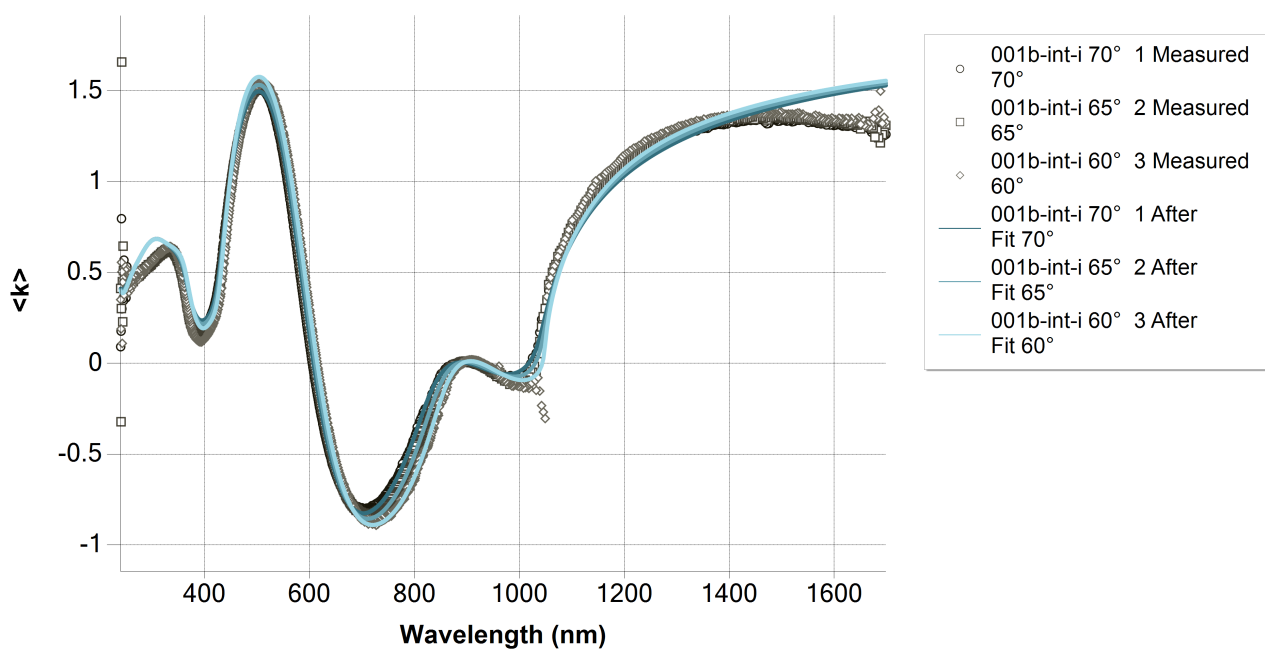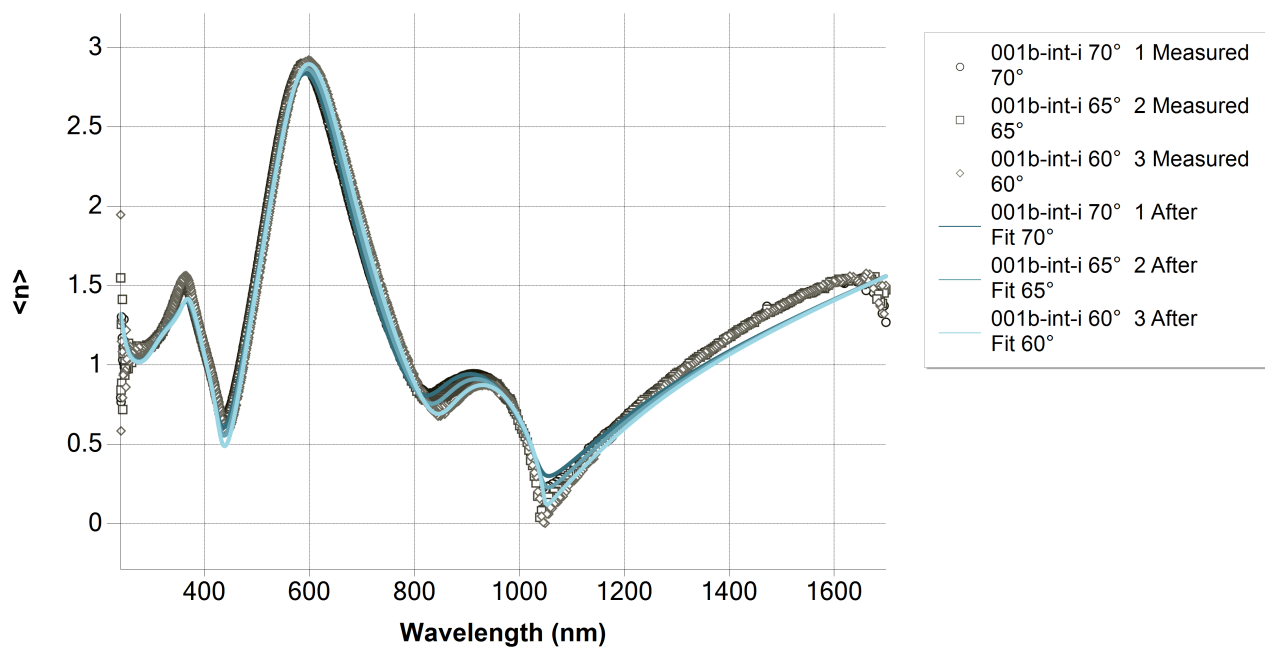
Phase 2 (InSn-Nanoparticles) - Dispersion graphs
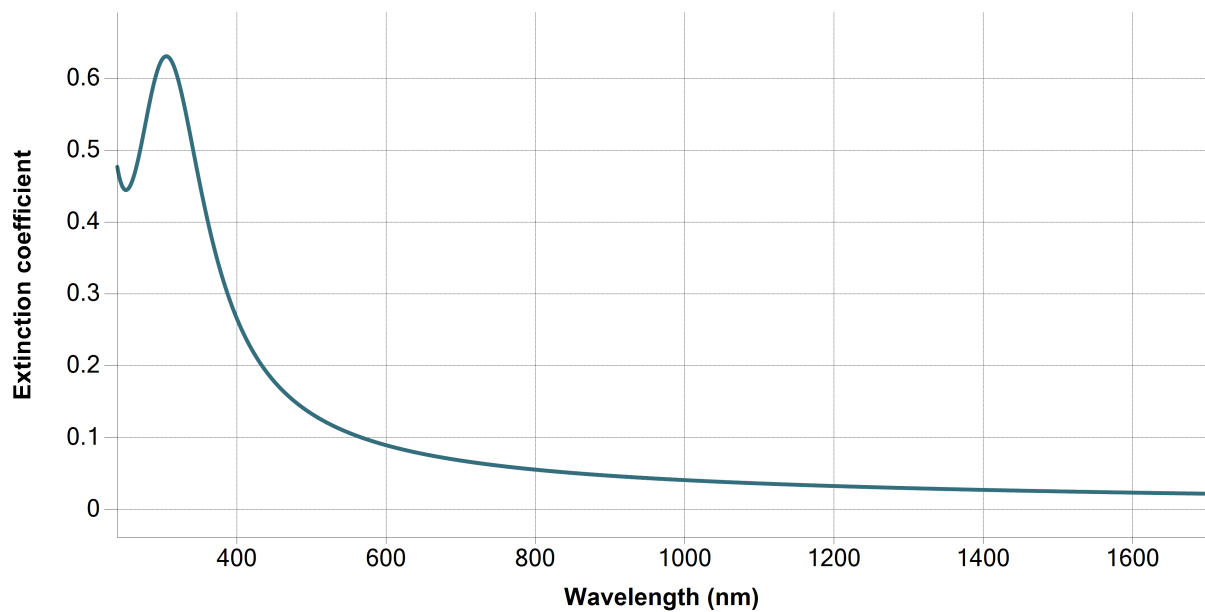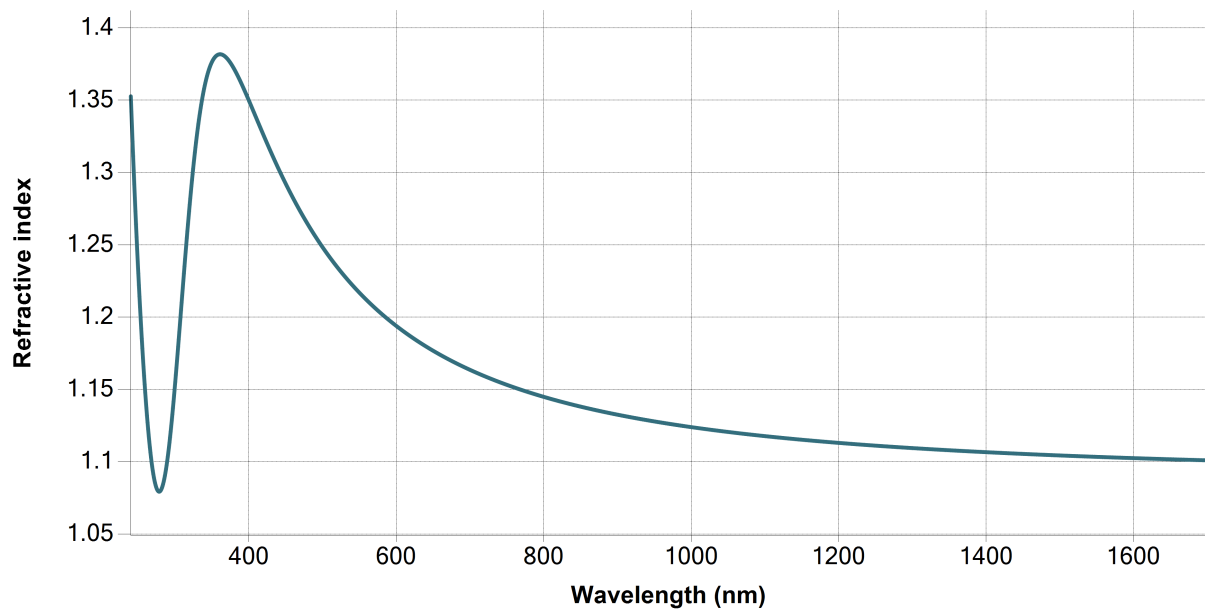
Phase 1 (Bulovic-ITO_tld) - Dispersion graphs

Substrate (si) - Dispersion graphs

Correlation coefficients	
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - f	0.0202
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - E0 (eV)	0.0221
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - Γ (eV)	0.0891
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - f	-0.3026
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - E0 (eV)	-0.1044
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - Γ (eV)	-0.066
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Bulovic-ITO_tld - Thickness	0.4867
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.4253
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.4918
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.4529
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.2688
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[1] - E0 (eV)	0.7513
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[1] - Γ (eV)	0.8149
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - f	-0.8935
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - E0 (eV)	-0.6757
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - Γ (eV)	-0.9222
Ph2 - Lorentz[1] - f --- Ph1 - Bulovic-ITO_tld - Thickness	0.0498
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.1829
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.1487
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.0835
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.3861
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[1] - Γ (eV)	0.7622
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - f	-0.7307
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - E0 (eV)	-0.4983
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - Γ (eV)	-0.7108
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	0.2146
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.1526
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	-0.25
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.2503
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.131
Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - f	-0.6753
Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - E0 (eV)	-0.4269
Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - Γ (eV)	-0.702
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	0.0516
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.1623
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.0482
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.0085
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.5463
Ph2 - Lorentz[2] - f --- Ph2 - Lorentz[2] - E0 (eV)	0.7908
Ph2 - Lorentz[2] - f --- Ph2 - Lorentz[2] - Γ (eV)	0.9131

Ph2 - Lorentz[2] - f --- Ph1 - Bulovic-ITO_tld - Thickness	-0.417
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.1796
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	-0.1993
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.1274
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.2618
Ph2 - Lorentz[2] - E0 (eV) --- Ph2 - Lorentz[2] - Γ (eV)	0.7759
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	-0.3481
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.0602
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	-0.1209
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.0485
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.0679
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	-0.1859
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.0766
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	-0.0875
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.0219
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.1914
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.0145
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.0977
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.0449
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.1257
Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.9355
Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.9716
Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.8143
Ph1 - Tauc-Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.9656
Ph1 - Tauc-Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.618
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.6583