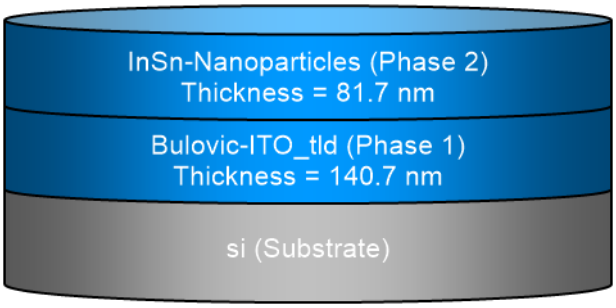
SEA regression report summary

Sample ID
001c-int-i 70° 1
001c-int-i 65° 2
001c-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 15:53
Comments	

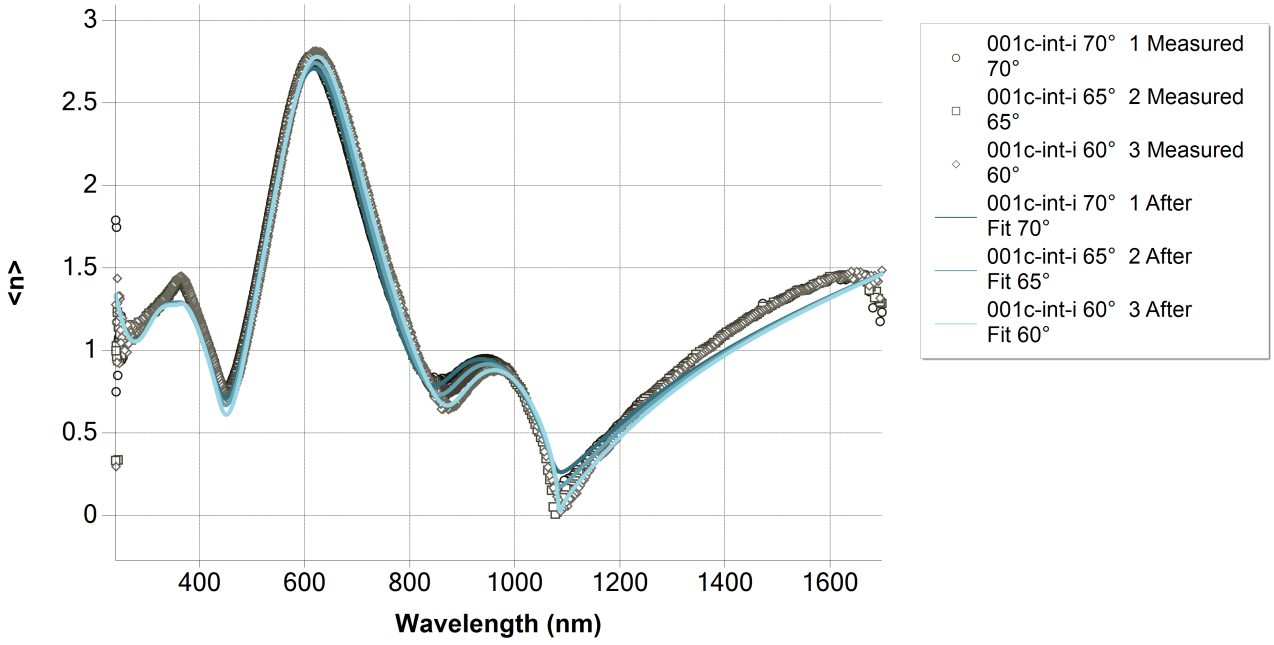
Layer structure	
Overview	
	
Optical model	
Phase 2	InSn-Nanoparticles
Dispersion law	Lorentz
	Lorentz
Phase 1	Bulovic-ITO_tld
Dispersion law	Tauc-Lorentz
	Drude

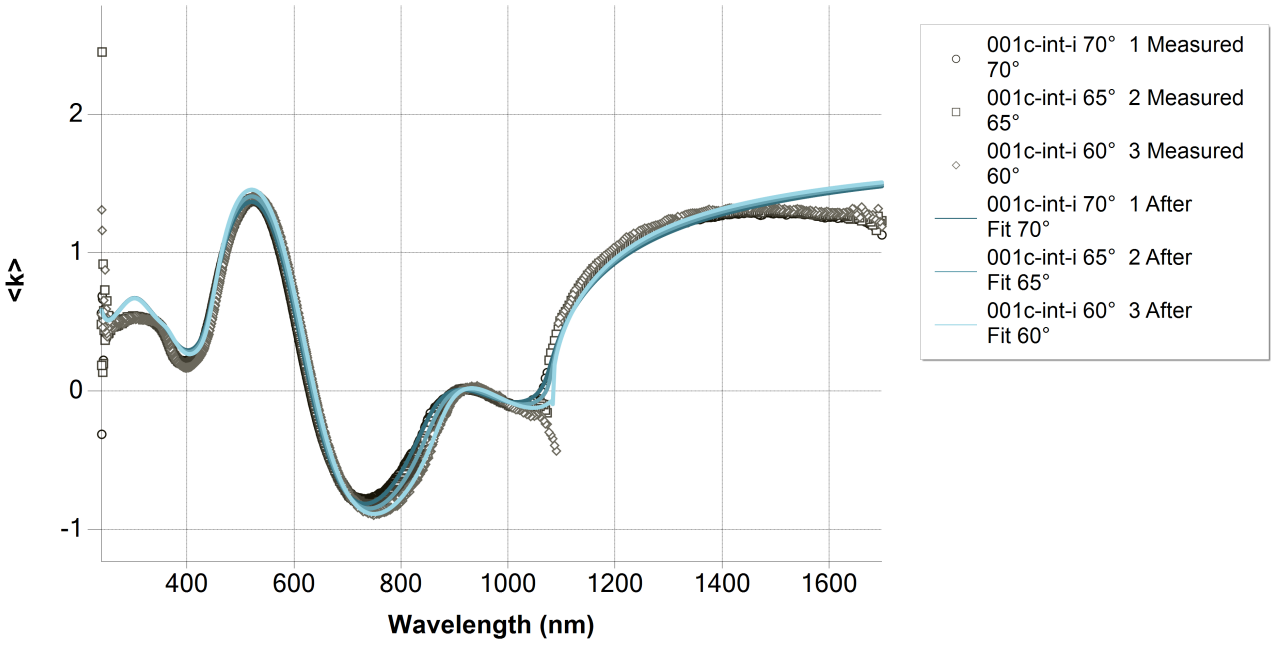
Regression results

Measurement information				
Measurement 1				
Measurement file path	C:\Users\emmabat\ito-si\001c-int-i.smdx			
Angle of Incidence	70°			
Measurement 2				
Measurement file path	C:\Users\emmabat\ito-si\001c-int-i.smdx			
Angle of Incidence	65°			
Measurement 3				
Measurement file path	C:\Users\emmabat\ito-si\001c-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	81.684	X	0.72241	nm
f	0.4713	X	0.023071	
E0 (eV)	3.962	X	0.022582	eV
Γ (eV)	1.39713	X	0.055898	eV
f	0.68427	X	0.025236	
E0 (eV)	5.94811	X	0.041028	eV
Γ (eV)	1.1767	X	0.12655	eV
Eps_inf	0			
Phase 1 (Bulovic-ITO_tld)				
Thickness	140.728	X	0.40732	nm
A (eV)	77.68804	X	7.58664	eV
E0 (eV)	8.19013	X	0.61676	eV
C (eV)	13.88621	X	2.97603	eV
Eg (eV)	1.60136	X	0.024545	eV

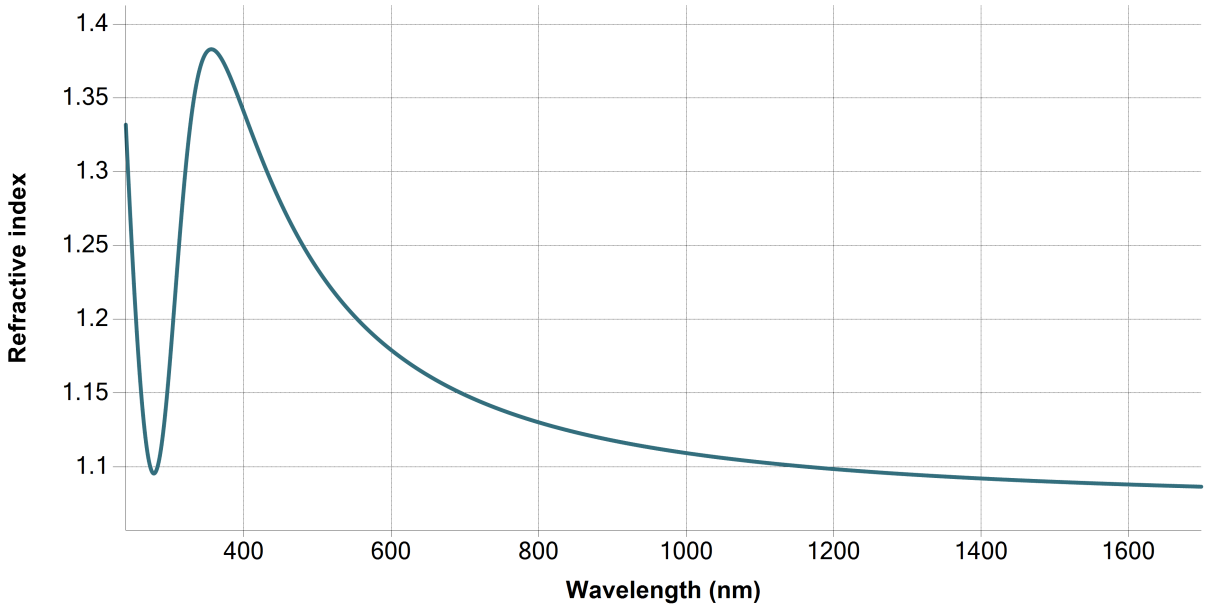
E_p (eV)	0.60764	X	0.01786	eV
E_Γ (eV)	0			eV
Eps_inf	0			
Derived parameters	Value			
Phase 2 (InSn-Nanoparticles)				
n @ 632.8 nm	1.1673			
k @ 632.8 nm	0.0825			
Phase 1 (Bulovic-ITO_tld)				
n @ 632.8 nm	1.9858			
k @ 632.8 nm	0.0307			
Substrate (si)				
n @ 632.8 nm	3.8811			
k @ 632.8 nm	0.0195			
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)	6.6945E+19 ± 3.9354E+18			at/cm3
P type dopant concentration (at/cm3)	9.9079E+19 ± 5.8244E+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	0.98885			
RMSE	0.07095			

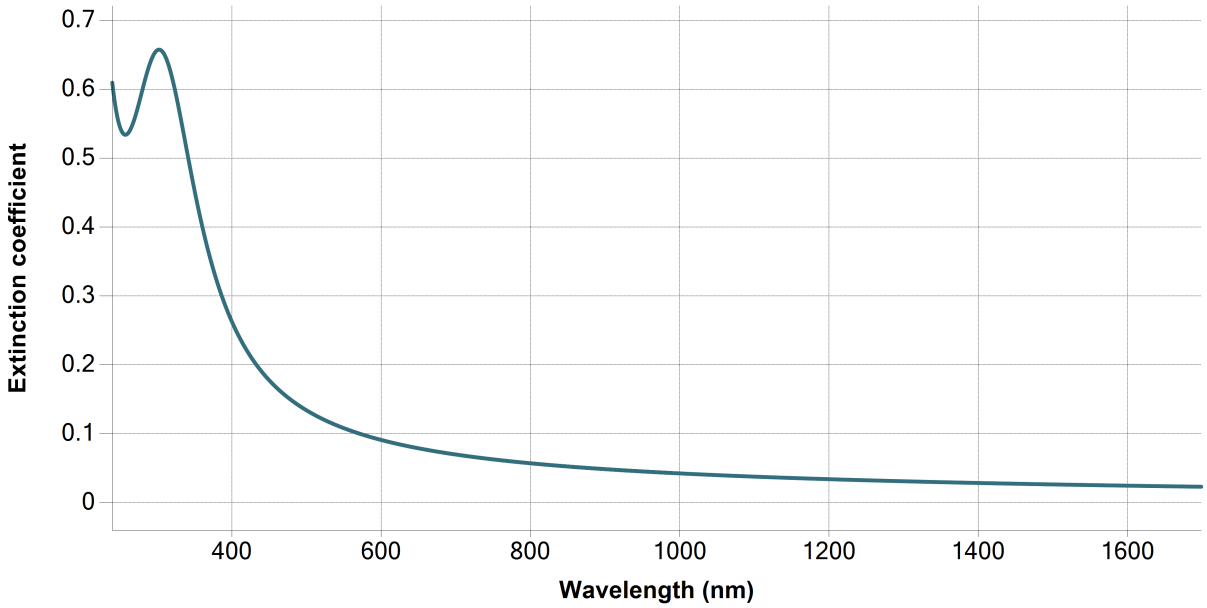
Regression graphs



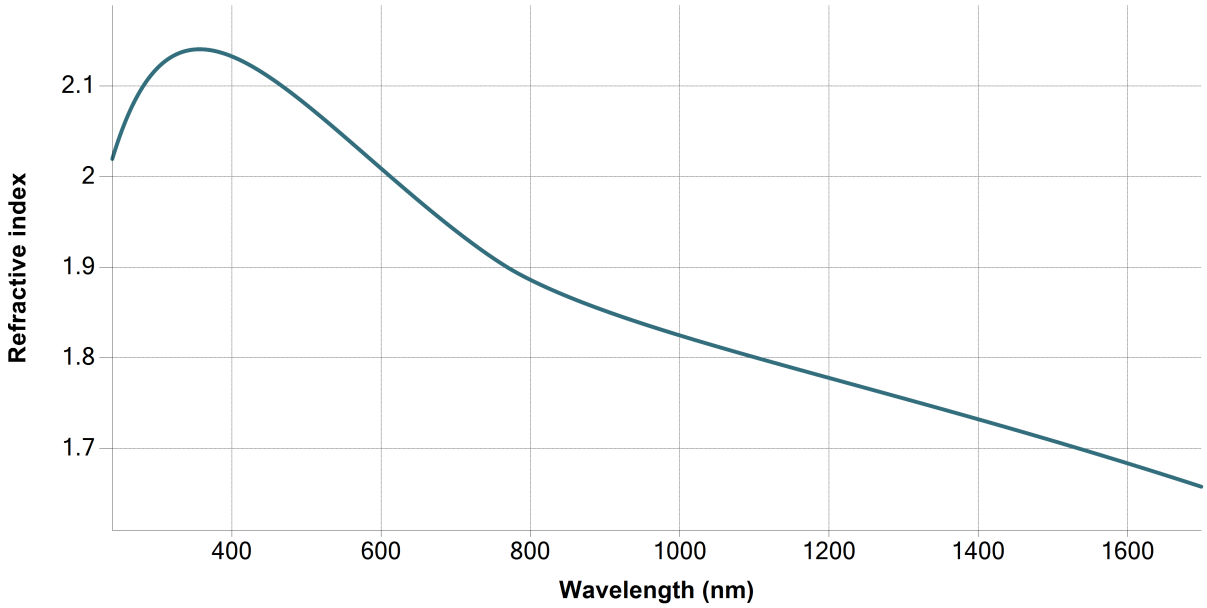


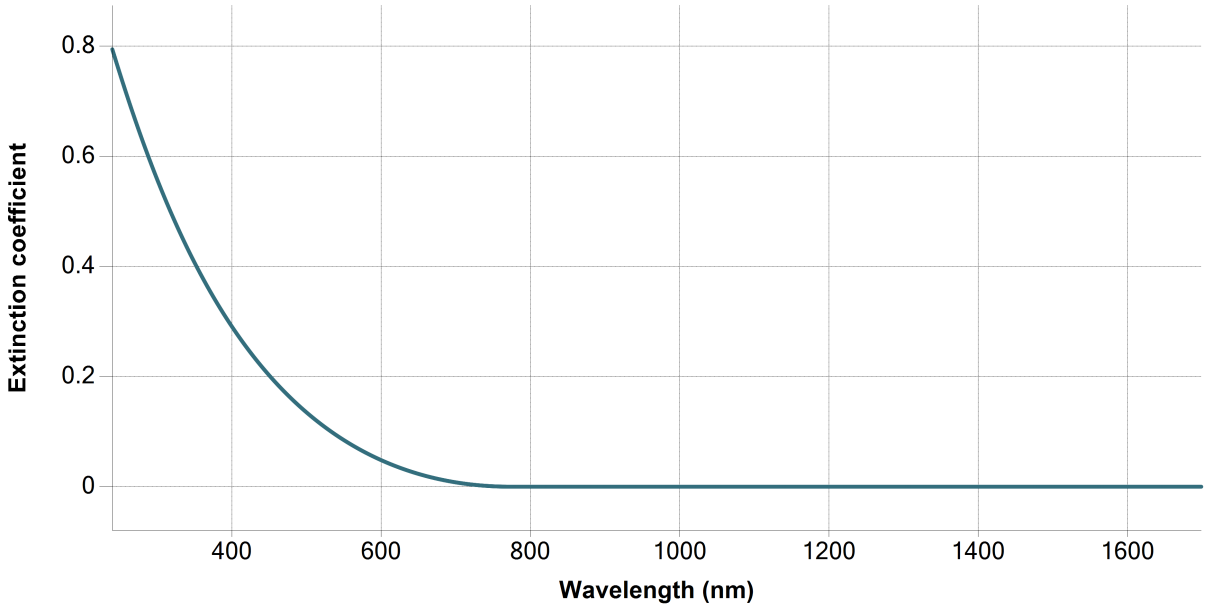
Phase 2 (InSn-Nanoparticles) - Dispersion graphs



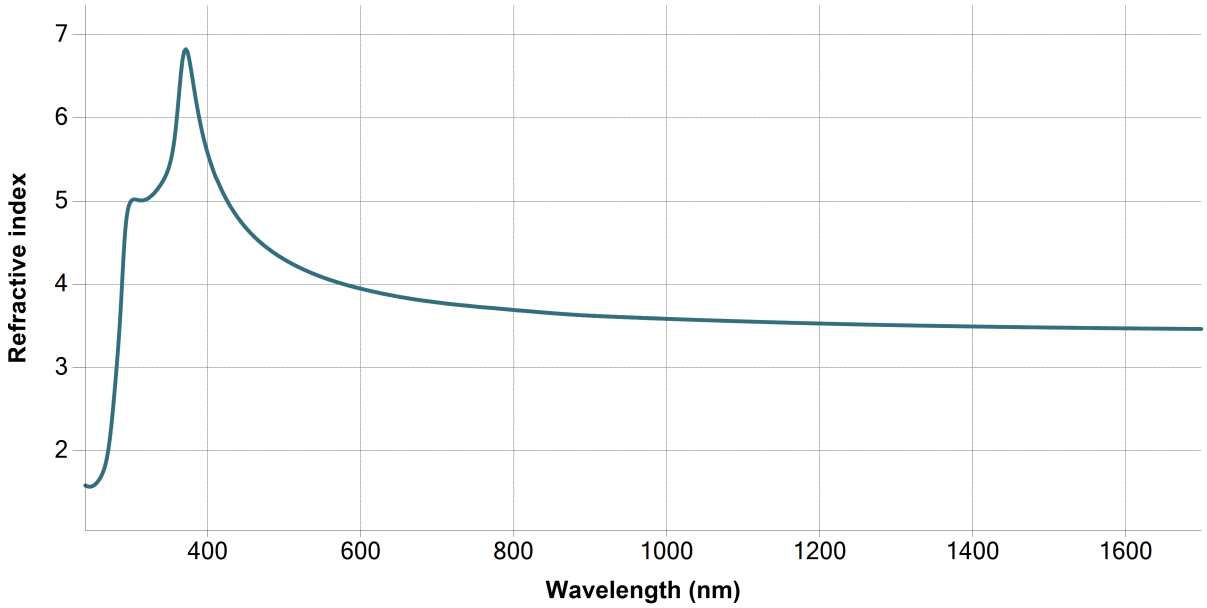


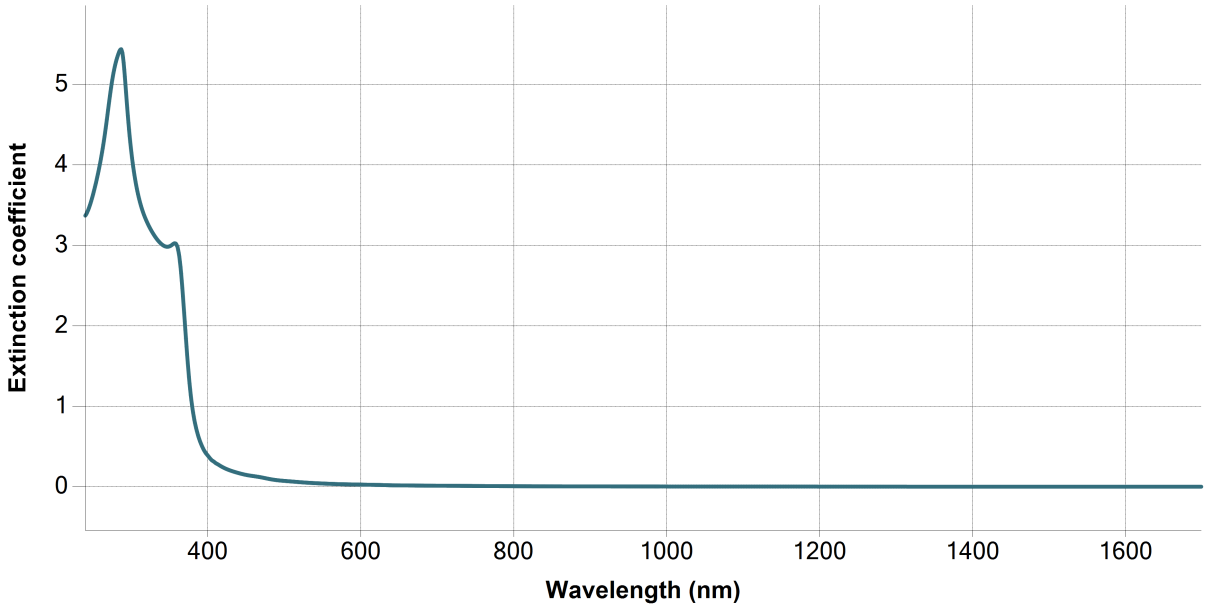
Phase 1 (Bulovic-ITO_tld) - Dispersion graphs





Substrate (si) - Dispersion graphs





Correlation coefficients	
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - f	0.1172
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - E0 (eV)	0.1366
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - Γ (eV)	0.2652
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - f	-0.3497
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - E0 (eV)	-0.1886
Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - Γ (eV)	-0.1465
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Bulovic-ITO_tld - Thickness	0.5063
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.5105
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.5232
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.5186
Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.4244
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[1] - E0 (eV)	0.8255
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[1] - Γ (eV)	0.8677
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - f	-0.9253
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - E0 (eV)	-0.5908
Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - Γ (eV)	-0.9324
Ph2 - Lorentz[1] - f --- Ph1 - Bulovic-ITO_tld - Thickness	-0.0291
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.3315
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.397
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.3336
Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.3185
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[1] - Γ (eV)	0.7966
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - f	-0.7869
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - E0 (eV)	-0.4189
Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - Γ (eV)	-0.7433
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	0.084
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.098
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.1388
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.0874
Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.1733
Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - f	-0.7646
Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - E0 (eV)	-0.3909
Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - Γ (eV)	-0.7449
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	-0.0637
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	0.4609
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.5129
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.444
Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.539
Ph2 - Lorentz[2] - f --- Ph2 - Lorentz[2] - E0 (eV)	0.7254
Ph2 - Lorentz[2] - f --- Ph2 - Lorentz[2] - Γ (eV)	0.9364

Ph2 - Lorentz[2] - f --- Ph1 - Bulovic-ITO_tld - Thickness	-0.2979
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.3216
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	-0.3879
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.332
Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.255
Ph2 - Lorentz[2] - E0 (eV) --- Ph2 - Lorentz[2] - Γ (eV)	0.731
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	-0.3575
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.147
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	-0.2088
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.1689
Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.0251
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Bulovic-ITO_tld - Thickness	-0.1173
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.2367
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	-0.3075
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	-0.2521
Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.1551
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - A (eV)	-0.0141
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.0258
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.0156
Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	-0.1356
Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV)	0.9762
Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.9958
Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.8845
Ph1 - Tauc-Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV)	0.9859
Ph1 - Tauc-Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.8046
Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV)	0.8409