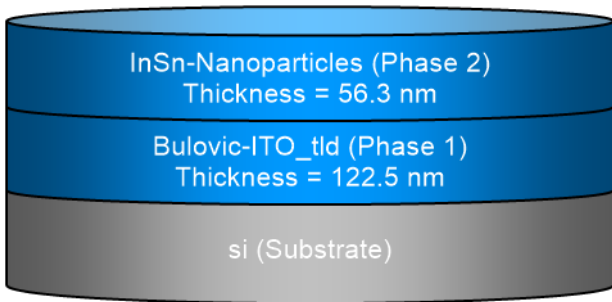


SEA regression report summary

| Sample ID |
|------------------|
| 001d-int-i 70° 1 |
| 001d-int-i 65° 2 |
| 001d-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 15:58 |
| Comments | |

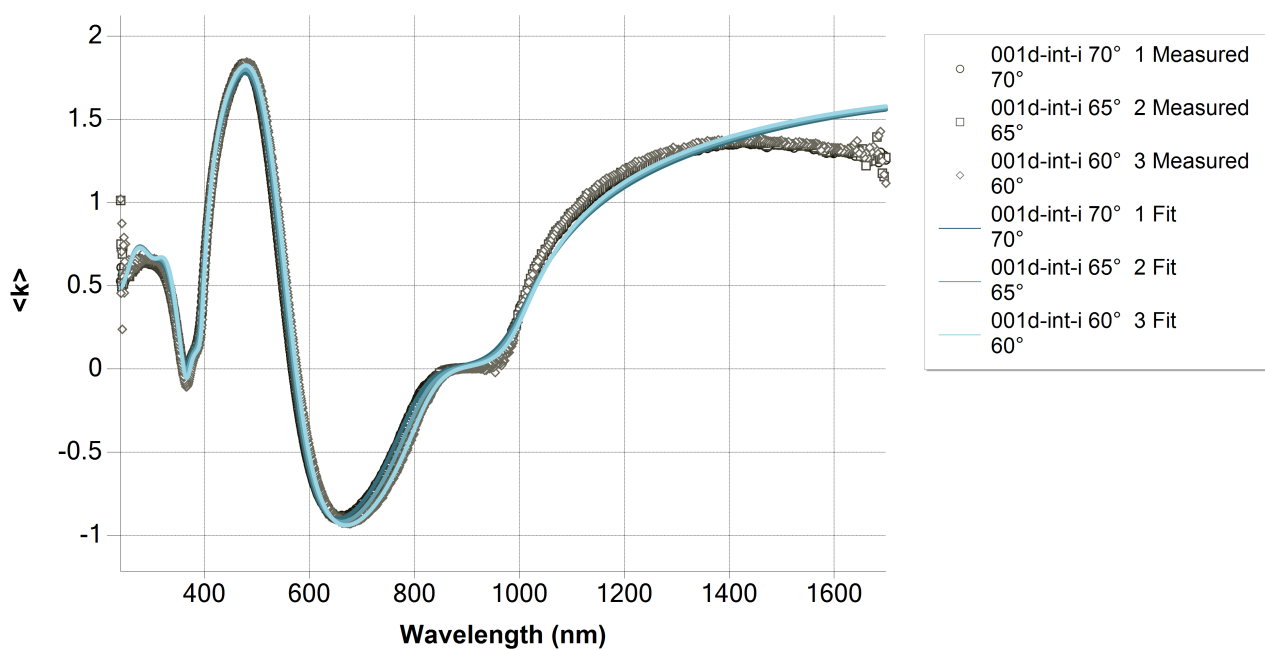
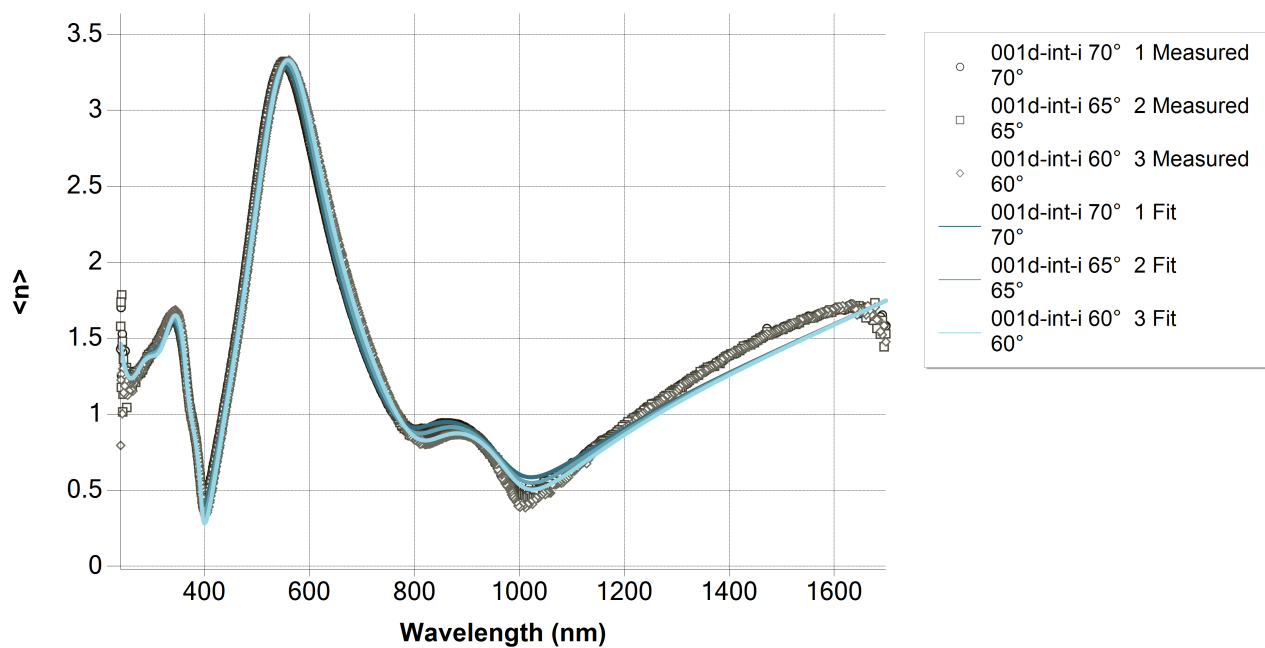
| Layer structure | |
|--|--------------------|
| Overview | |
|  <p>The diagram illustrates a three-layer structure. The top layer is labeled 'InSn-Nanoparticles (Phase 2)' with a thickness of 56.3 nm. The middle layer is labeled 'Bulovic-ITO_tld (Phase 1)' with a thickness of 122.5 nm. The bottom layer is labeled 'si (Substrate)'.</p> | |
| Optical model | |
| Phase 2 | InSn-Nanoparticles |
| Dispersion law | Lorentz |
| | Lorentz |
| Phase 1 | Bulovic-ITO_tld |
| Dispersion law | Tauc-Lorentz |
| | Drude |

Regression results

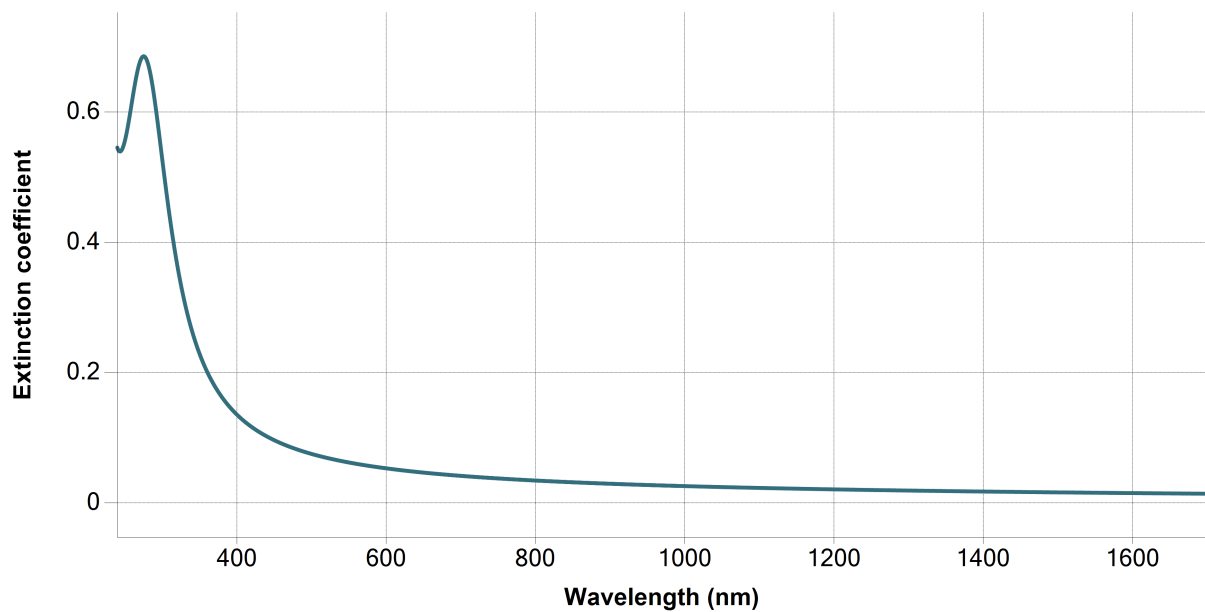
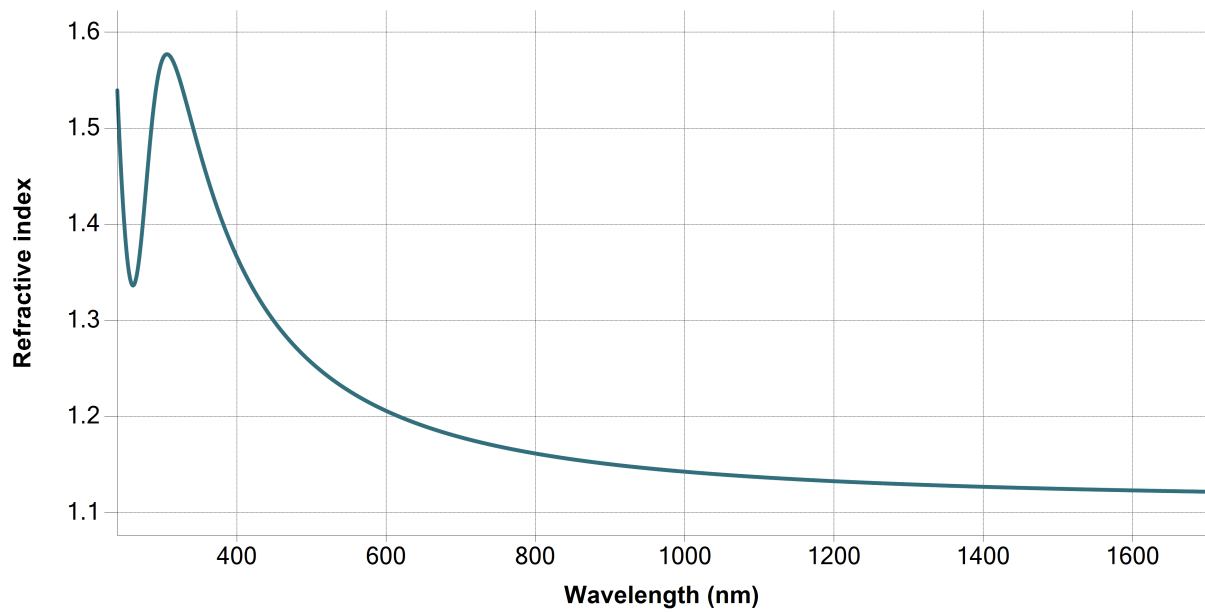
| Measurement information | | | | |
|-----------------------------------|---|--------|----------------------|------|
| Measurement 1 | | | | |
| Measurement file path | C:\Users\emmabat\ito-si\001d-int-i.smdx | | | |
| Angle of Incidence | 70° | | | |
| Measurement 2 | | | | |
| Measurement file path | C:\Users\emmabat\ito-si\001d-int-i.smdx | | | |
| Angle of Incidence | 65° | | | |
| Measurement 3 | | | | |
| Measurement file path | C:\Users\emmabat\ito-si\001d-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 | 56.255 | X | 0.34347 | nm |
| f | 0.43864 | X | 0.022093 | |
| E0 (eV) | 4.40665 | X | 0.019038 | eV |
| Γ (eV) | 1.16833 | X | 0.041496 | eV |
| f | 0.79632 | X | 0.025646 | |
| E0 (eV) | 5.96216 | X | 0.030879 | eV |
| Γ (eV) | 0.68299 | X | 0.088716 | eV |
| Eps_inf | 0 | | | |
| Phase 1 (Bulovic-ITO_tld) | | | | |
| Thickness | 122.453 | X | 0.22661 | nm |
| A (eV) | 127.38262 | X | 4.27572 | eV |
| E0 (eV) | 12.31551 | X | 0.34646 | eV |
| C (eV) | 23.05147 | X | 1.70367 | eV |
| Eg (eV) | 2.02321 | X | 0.015644 | eV |

| | | | | |
|--------------------------------------|-------------------------|---|-----------|--------|
| E_p (eV) | 0.87803 | X | 0.0070246 | eV |
| E_Γ (eV) | 0 | | | eV |
| Eps_inf | 0 | | | |
| Derived parameters | Value | | | |
| Phase 2 (InSn-Nanoparticles) | | | | |
| n @ 632.8 nm | 1.1953 | | | |
| k @ 632.8 nm | 0.0486 | | | |
| Phase 1 (Bulovic-ITO_tld) | | | | |
| n @ 632.8 nm | 2.0395 | | | |
| k @ 632.8 nm | 0 | | | |
| 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) | 1.3978E+20 ± 2.2366E+18 | | | at/cm3 |
| P type dopant concentration (at/cm3) | 2.0687E+20 ± 3.3102E+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 | 0.9948 | | | |
| RMSE | 0.05732 | | | |

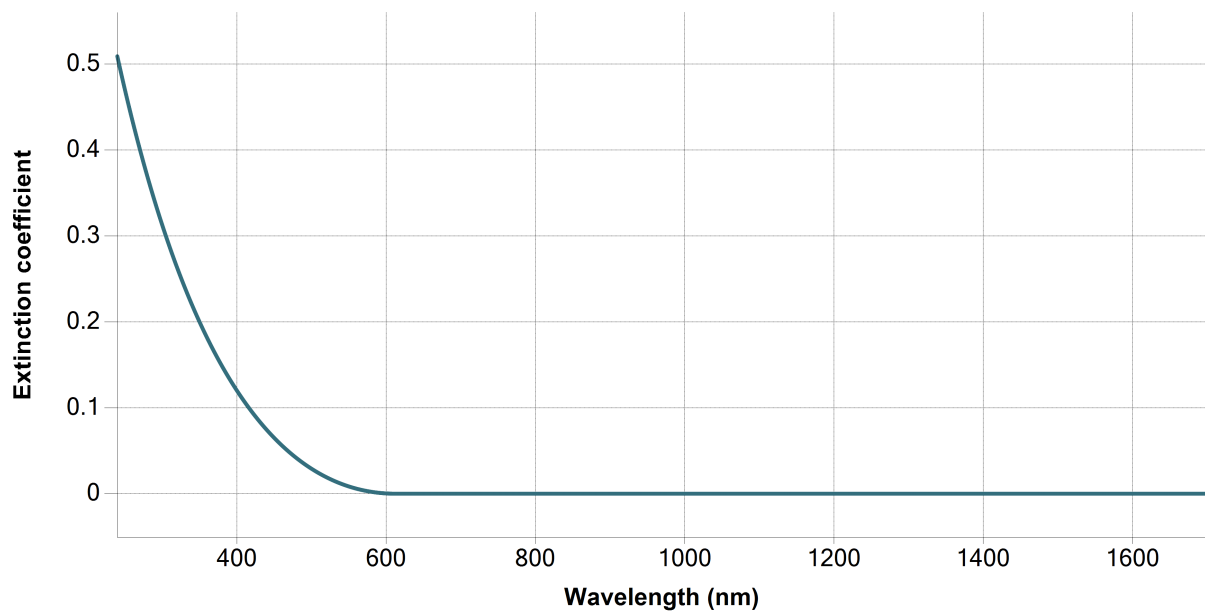
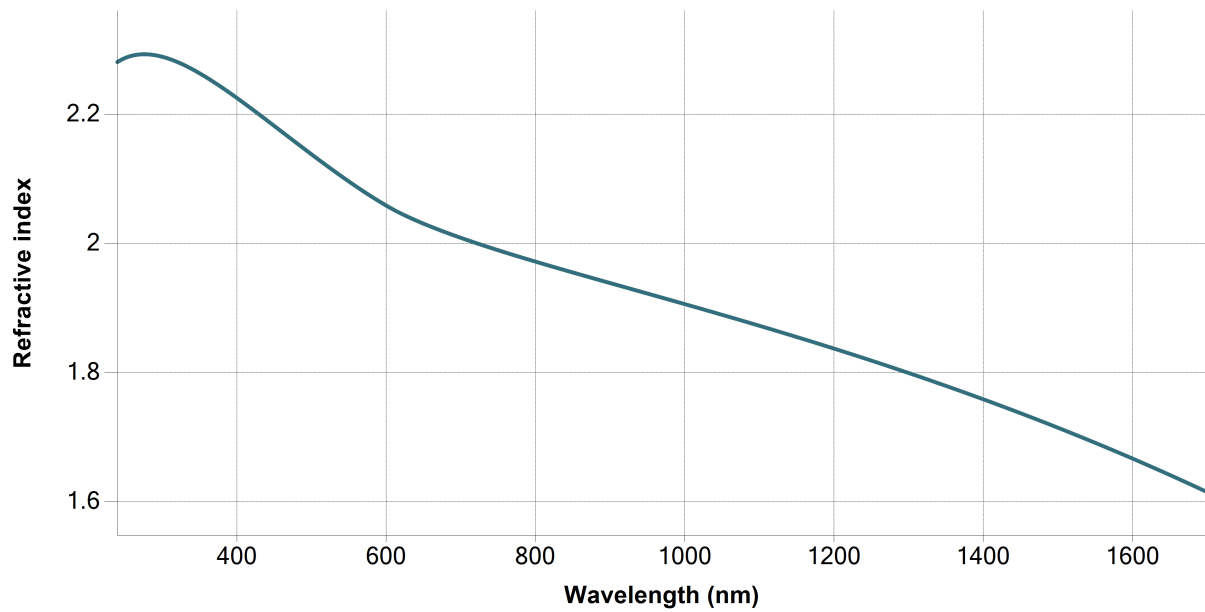
Regression graphs



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 | 0.0398 |
| Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - E0 (eV) | -0.0002 |
| Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[1] - Γ (eV) | 0.0113 |
| Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - f | -0.2989 |
| Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - E0 (eV) | -0.2772 |
| Ph2 - InSn-Nanoparticles - Thickness --- Ph2 - Lorentz[2] - Γ (eV) | -0.0601 |
| Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Bulovic-ITO_tld - Thickness | 0.5364 |
| Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - A (eV) | 0.2007 |
| Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - E0 (eV) | 0.3935 |
| Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV) | 0.2897 |
| Ph2 - InSn-Nanoparticles - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | -0.198 |
| Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[1] - E0 (eV) | 0.8591 |
| Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[1] - Γ (eV) | 0.8909 |
| Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - f | -0.942 |
| Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - E0 (eV) | -0.6457 |
| Ph2 - Lorentz[1] - f --- Ph2 - Lorentz[2] - Γ (eV) | -0.9656 |
| Ph2 - Lorentz[1] - f --- Ph1 - Bulovic-ITO_tld - Thickness | 0.0396 |
| Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - A (eV) | 0.0881 |
| Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - E0 (eV) | 0.2398 |
| Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - C (eV) | 0.125 |
| Ph2 - Lorentz[1] - f --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | -0.065 |
| Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[1] - Γ (eV) | 0.8669 |
| Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - f | -0.7816 |
| Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - E0 (eV) | -0.4204 |
| Ph2 - Lorentz[1] - E0 (eV) --- Ph2 - Lorentz[2] - Γ (eV) | -0.7938 |
| Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Bulovic-ITO_tld - Thickness | 0.0566 |
| Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV) | 0.0457 |
| Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV) | 0.1313 |
| Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV) | 0.0507 |
| Ph2 - Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | 0.0388 |
| Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - f | -0.7904 |
| Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - E0 (eV) | -0.4439 |
| Ph2 - Lorentz[1] - Γ (eV) --- Ph2 - Lorentz[2] - Γ (eV) | -0.8365 |
| Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Bulovic-ITO_tld - Thickness | 0.0168 |
| Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV) | 0.1645 |
| Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV) | 0.2514 |
| Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV) | 0.161 |
| Ph2 - Lorentz[1] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | 0.1677 |
| Ph2 - Lorentz[2] - f --- Ph2 - Lorentz[2] - E0 (eV) | 0.7744 |
| Ph2 - Lorentz[2] - f --- Ph2 - Lorentz[2] - Γ (eV) | 0.9396 |

| | |
|--|---------|
| Ph2 - Lorentz[2] - f --- Ph1 - Bulovic-ITO_tld - Thickness | -0.2828 |
| Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - A (eV) | -0.1075 |
| Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - E0 (eV) | -0.3359 |
| Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - C (eV) | -0.1813 |
| Ph2 - Lorentz[2] - f --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | 0.2104 |
| Ph2 - Lorentz[2] - E0 (eV) --- Ph2 - Lorentz[2] - Γ (eV) | 0.7172 |
| Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Bulovic-ITO_tld - Thickness | -0.3094 |
| Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV) | -0.058 |
| Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV) | -0.3017 |
| Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV) | -0.1529 |
| Ph2 - Lorentz[2] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | 0.3556 |
| Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Bulovic-ITO_tld - Thickness | -0.0799 |
| Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - A (eV) | -0.0445 |
| Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV) | -0.2218 |
| Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV) | -0.0995 |
| Ph2 - Lorentz[2] - Γ (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | 0.1781 |
| Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - A (eV) | 0.1046 |
| Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - E0 (eV) | 0.362 |
| Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - C (eV) | 0.2268 |
| Ph1 - Bulovic-ITO_tld - Thickness --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | -0.3121 |
| Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - E0 (eV) | 0.895 |
| Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV) | 0.9801 |
| Ph1 - Tauc-Lorentz[1] - A (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | 0.6144 |
| Ph1 - Tauc-Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - C (eV) | 0.9544 |
| Ph1 - Tauc-Lorentz[1] - E0 (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | 0.2578 |
| Ph1 - Tauc-Lorentz[1] - C (eV) --- Ph1 - Tauc-Lorentz[1] - Eg (eV) | 0.455 |