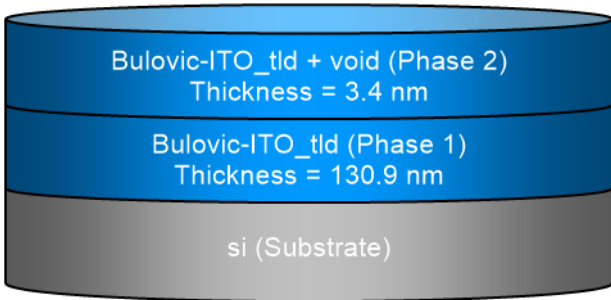


## SEA regression report summary

Sample ID
001c 65° 1
001c 70° 2
001c 75° 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 15:45
Comments	

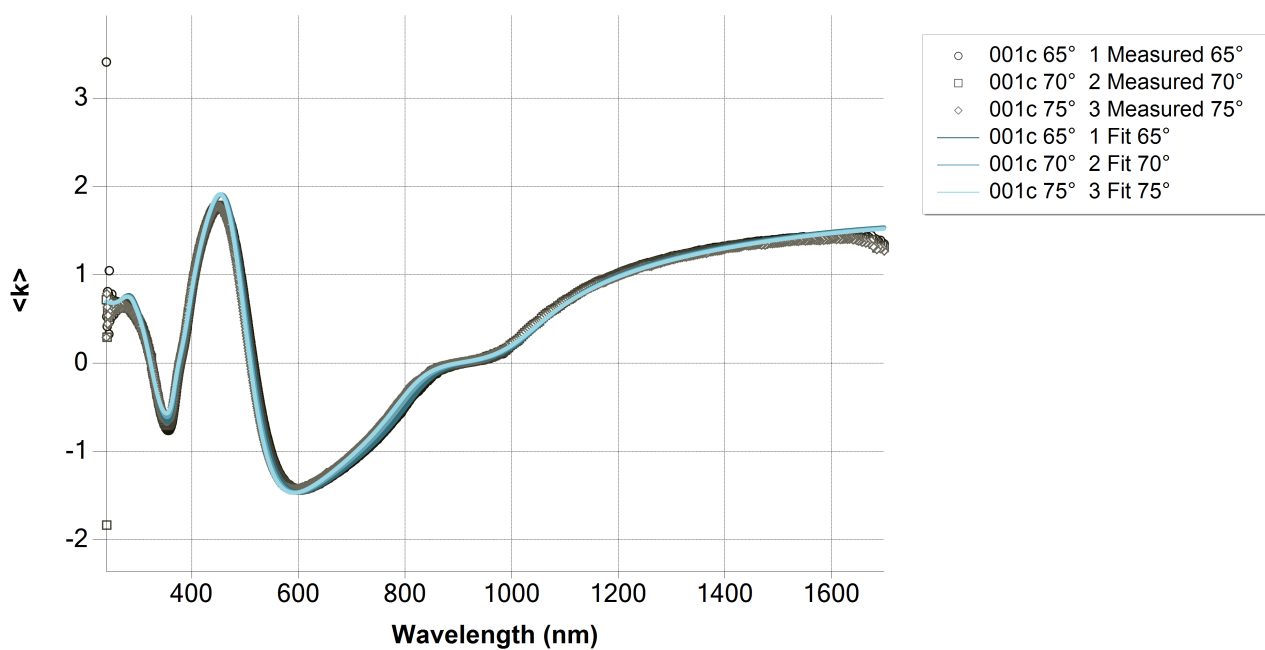
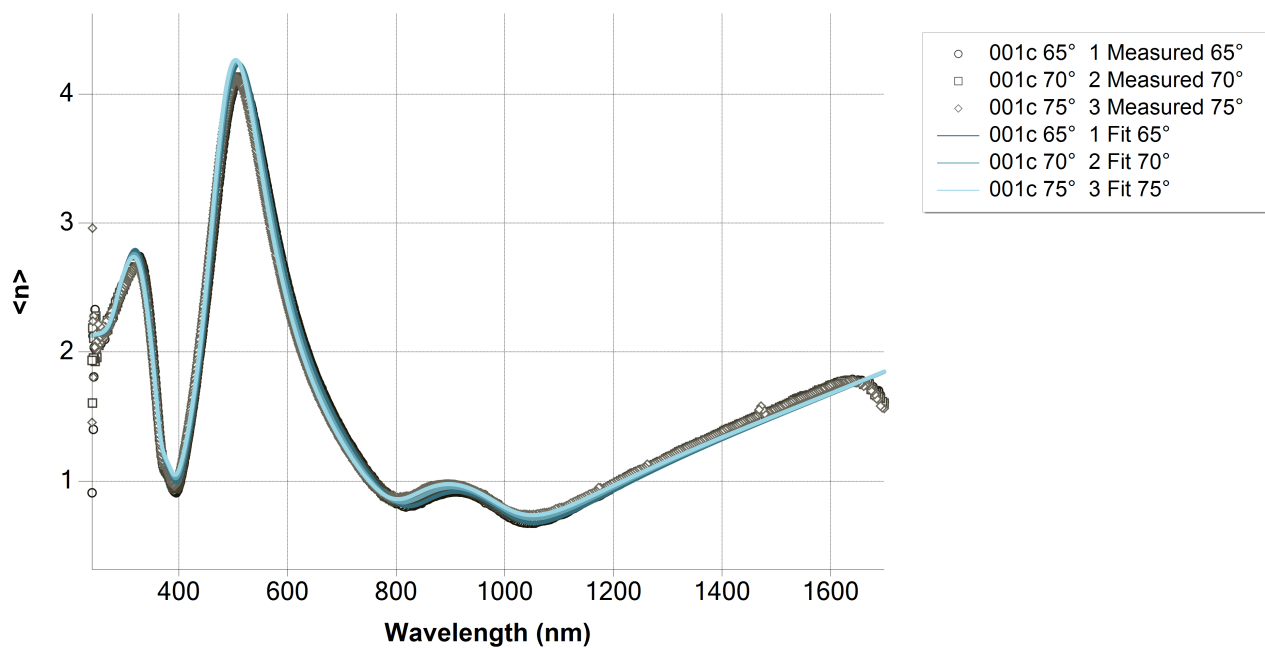
Layer structure	
Overview	
	
Optical model	
Phase 2	Bulovic-ITO_tld + void
Diffusion	
Phase 1	Bulovic-ITO_tld
Dispersion law	Tauc-Lorentz
	Drude

## Regression results

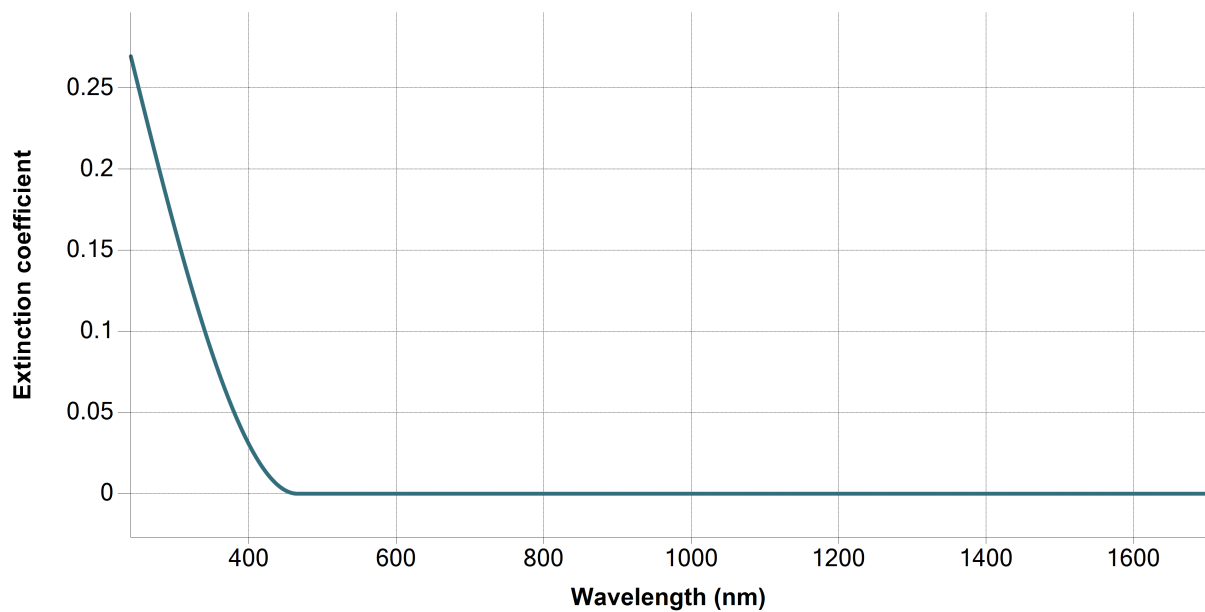
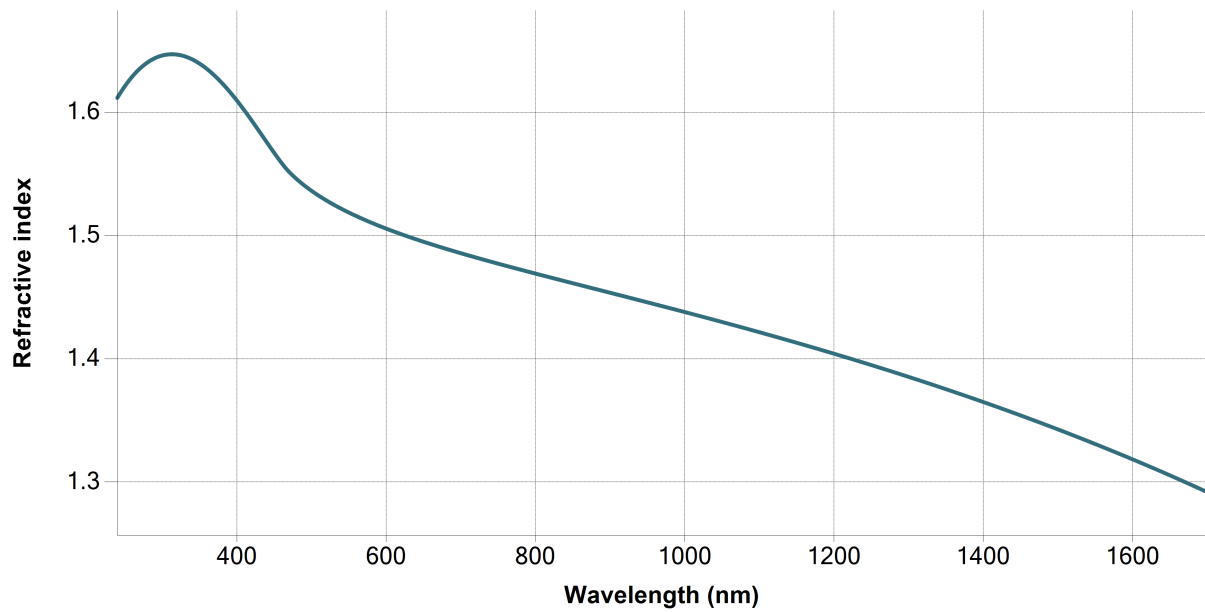
Measurement information				
Measurement 1				
Measurement file path	C:\Users\emmabat\ito-si\001c.smdx			
Angle of Incidence	65°			
Measurement 2				
Measurement file path	C:\Users\emmabat\ito-si\001c.smdx			
Angle of Incidence	70°			
Measurement 3				
Measurement file path	C:\Users\emmabat\ito-si\001c.smdx			
Angle of Incidence	75°			
Regression details				
Regression 1 (EllipsoReflectance)				
Wavelength range	239.84 - 1698.83 nm			
Angle of Incidence	65°			
Fit to	<n>, <k>			
Regression 2 (EllipsoReflectance)				
Wavelength range	239.84 - 1698.83 nm			
Angle of Incidence	70°			
Fit to	<n>, <k>			
Regression 3 (EllipsoReflectance)				
Wavelength range	239.84 - 1698.83 nm			
Angle of Incidence	75°			
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 (Bulovic-ITO_tld + void)				
Thickness	3.373	X	0.11778	nm
Depolarization coefficient	0.33333			
Concentration 1	0.5			
Concentration 2	0.5			
Phase 1 (Bulovic-ITO_tld)				
Thickness	130.894	X	0.17922	nm
A (eV)	308.57025	X	21.60037	eV
E0 (eV)	9.79768	X	0.16352	eV
C (eV)	46.40215	X	3.78706	eV
Eg (eV)	2.66119	X	0.010285	eV
E_p (eV)	0.92041	X	0.0067976	eV
E_Γ (eV)	0			eV
Eps_inf	0			
Derived parameters	Value			

Phase 2 (Bulovic-ITO_tld + void)		
n @ 632.8 nm	1.4985	
k @ 632.8 nm	0	
Phase 1 (Bulovic-ITO_tld)		
n @ 632.8 nm	2.0547	
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)	$\infty \pm \text{NaN}$	S/m
Resistivity (m $\Omega$ .cm)	$0 \pm \text{NaN}$	m $\Omega$ .cm
Resistance ( $\Omega$ /sq)	$0 \pm \text{NaN}$	$\Omega$ /sq
N type dopant concentration (at/cm <sup>3</sup> )	$1.536\text{E}+20 \pm 2.2688\text{E}+18$	at/cm <sup>3</sup>
P type dopant concentration (at/cm <sup>3</sup> )	$2.2733\text{E}+20 \pm 3.3578\text{E}+18$	at/cm <sup>3</sup>
N type dopant mobility (cm <sup>2</sup> /Vs)	$\infty \pm \text{NaN}$	cm <sup>2</sup> /Vs
P type dopant mobility (cm <sup>2</sup> /Vs)	$\infty \pm \text{NaN}$	cm <sup>2</sup> /Vs
Fit quality		
R <sup>2</sup>	0.99526	
RMSE	0.06484	

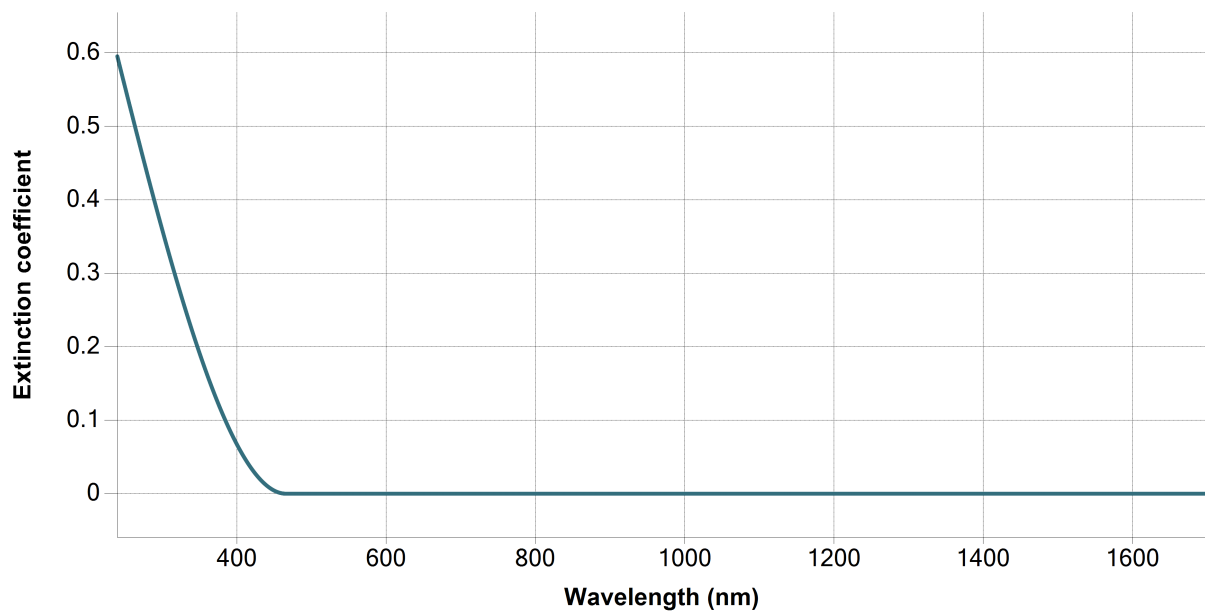
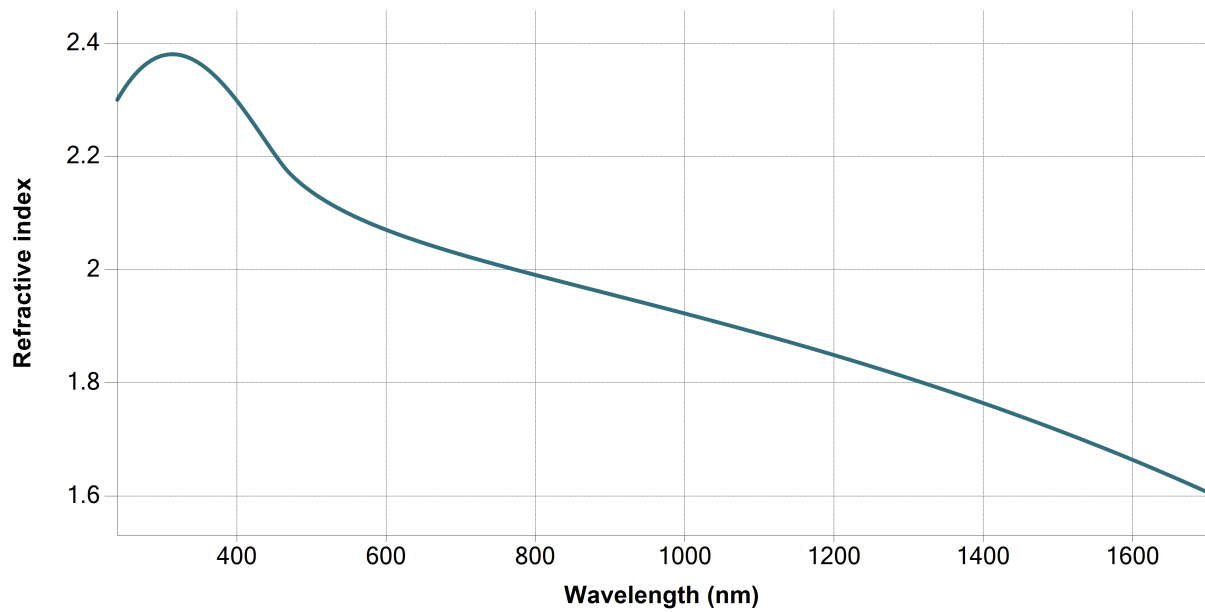
## Regression graphs



## Phase 2 (Bulovic-ITO\_tld + void) - Dispersion graphs



## Phase 1 (Bulovic-ITO\_tld) - Dispersion graphs



## Substrate (si) - Dispersion graphs



Correlation coefficients							
	Ph2 - Bulovic-ITO_tld + void - Thickness	Ph1 - Bulovic-ITO_tld - Thickness	Ph1 - Tauc-Lorentz[1] - A (eV)	Ph1 - Tauc-Lorentz[1] - E0 (eV)	Ph1 - Tauc-Lorentz[1] - C (eV)	Ph1 - Tauc-Lorentz[1] - Eg (eV)	Ph1 - Drude[2] - E_p (eV)
Ph2 - Bulovic-ITO_tld + void - Thickness	1	-0.4844	-0.1346	0.0272	-0.1362	-0.0411	-0.0899
Ph1 - Bulovic-ITO_tld - Thickness		1	0.0339	0.0281	0.0661	0.026	-0.2758
Ph1 - Tauc-Lorentz[1] - A (eV)			1	-0.1571	0.9686	0.8767	0.4469
Ph1 - Tauc-Lorentz[1] - E0 (eV)				1	0.0904	-0.4899	0.2636
Ph1 - Tauc-Lorentz[1] - C (eV)					1	0.7541	0.4977
Ph1 - Tauc-Lorentz[1] - Eg (eV)						1	0.3
Ph1 - Drude[2] - E_p (eV)							1