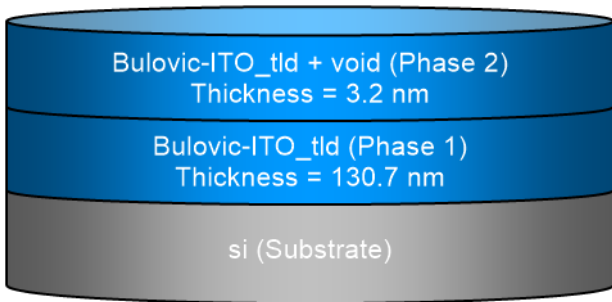


SEA regression report summary

Sample ID
001e 65° 1
001e 70° 2
001e 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 16:01
Comments	

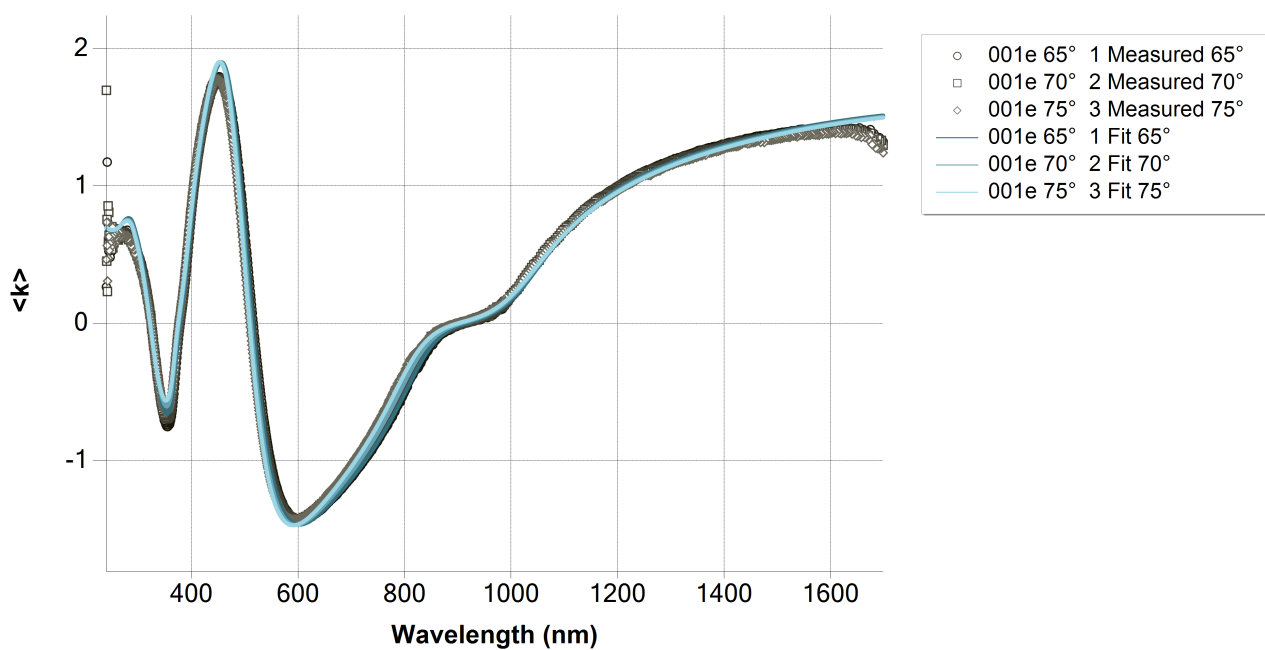
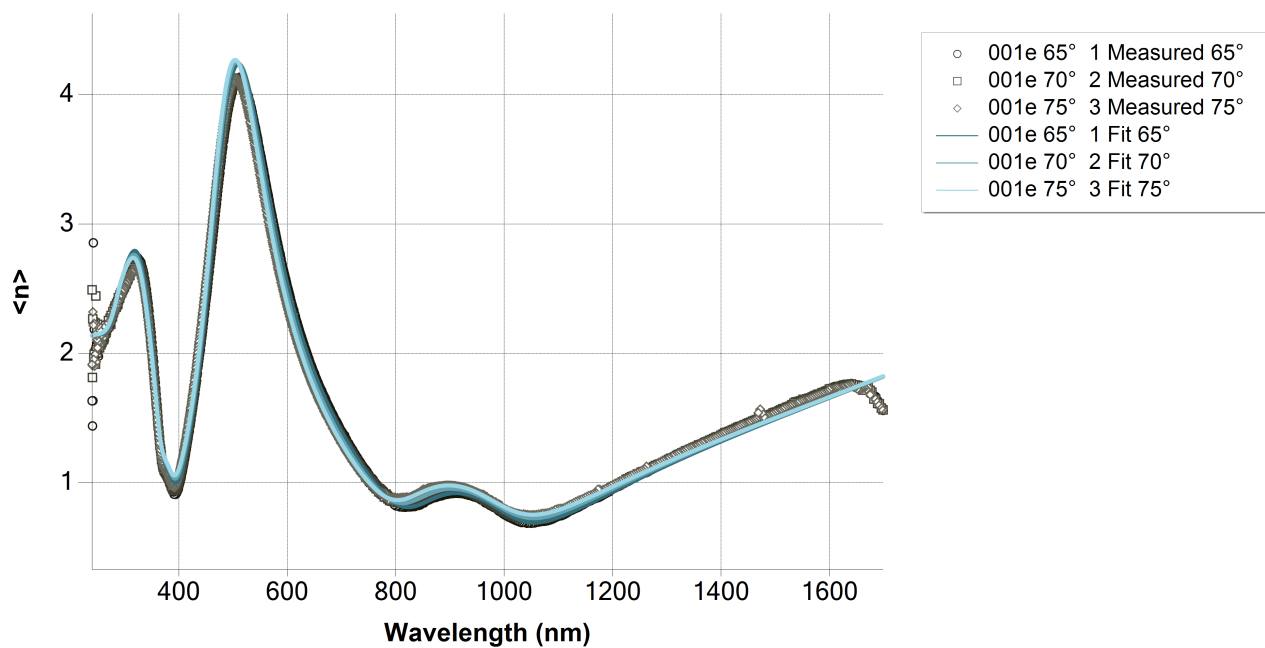
Layer structure	
Overview	
 <p>The diagram illustrates a three-layer structure. The top layer is labeled 'Bulovic-ITO_tld + void (Phase 2)' with a thickness of 3.2 nm. The middle layer is labeled 'Bulovic-ITO_tld (Phase 1)' with a thickness of 130.7 nm. The bottom layer is labeled 'si (Substrate)'.</p>	
Optical model	
Phase 2	Bulovic-ITO_tld + void
Diffusion	
Phase 1	Bulovic-ITO_tld
Dispersion law	Tauc-Lorentz
	Drude

Regression results

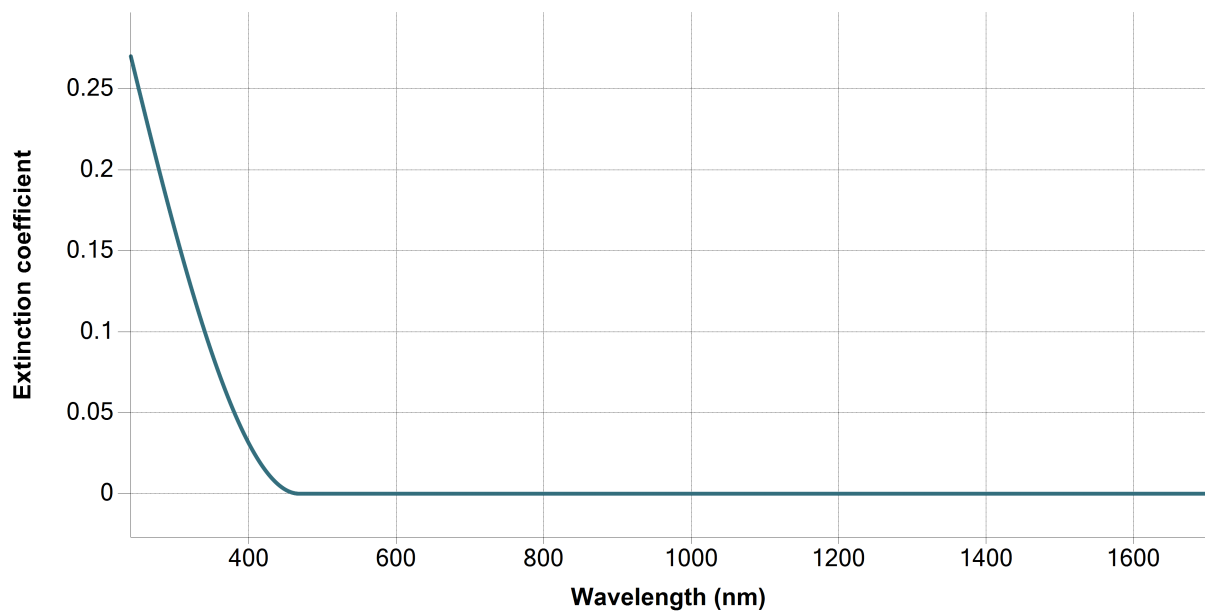
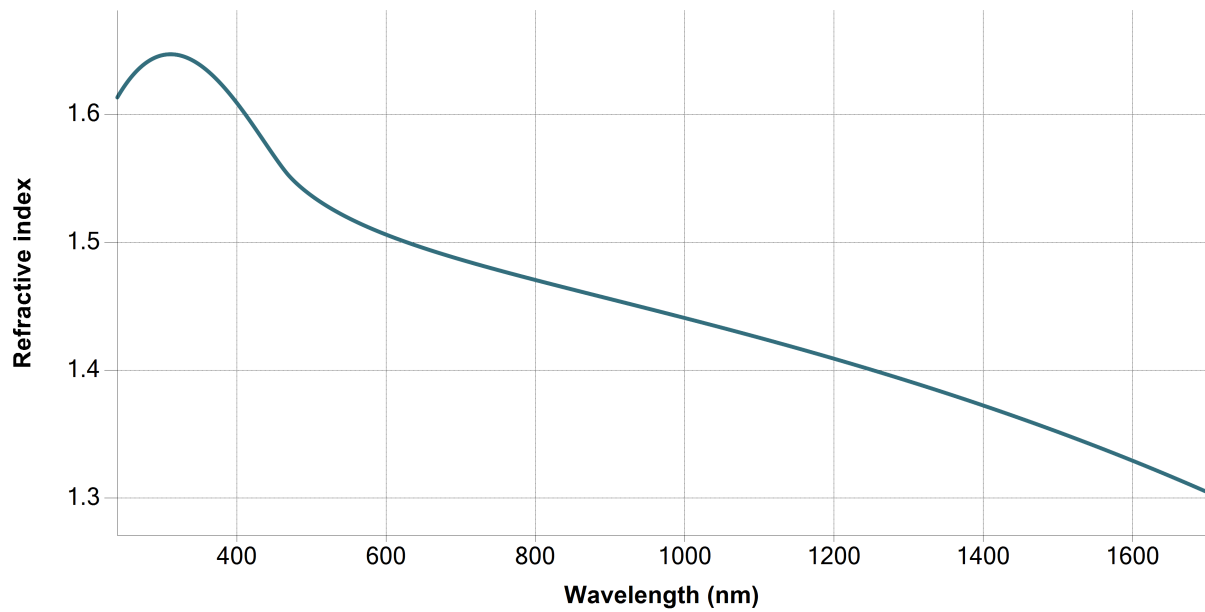
Measurement information				
Measurement 1				
Measurement file path	C:\Users\emmabat\lito-sil\001e.smdx			
Angle of Incidence	65°			
Measurement 2				
Measurement file path	C:\Users\emmabat\lito-sil\001e.smdx			
Angle of Incidence	70°			
Measurement 3				
Measurement file path	C:\Users\emmabat\lito-sil\001e.smdx			
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	3.239	X	0.091485	nm
Depolarization coefficient	0.33333			
Concentration 1	0.5			
Concentration 2	0.5			
Phase 1 (Bulovic-ITO_tld)				
Thickness	130.748	X	0.14478	nm
A (eV)	284.62536	X	14.34374	eV
E0 (eV)	9.86024	X	0.11755	eV
C (eV)	42.63978	X	2.67239	eV
Eg (eV)	2.64745	X	0.0083374	eV
E_p (eV)	0.89093	X	0.0057188	eV
E_Γ (eV)	0			eV
Eps_inf	0			
Derived parameters	Value			

Phase 2 (Bulovic-ITO_tld + void)		
n @ 632.8 nm	1.4989	
k @ 632.8 nm	0	
Phase 1 (Bulovic-ITO_tld)		
n @ 632.8 nm	2.0556	
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 Ω .cm)	$0 \pm \text{NaN}$	m Ω .cm
Resistance (Ω /sq)	$0 \pm \text{NaN}$	Ω /sq
N type dopant concentration (at/cm ³)	$1.4392\text{E}+20 \pm 1.8476\text{E}+18$	at/cm ³
P type dopant concentration (at/cm ³)	$2.13\text{E}+20 \pm 2.7344\text{E}+18$	at/cm ³
N type dopant mobility (cm ² /Vs)	$\infty \pm \text{NaN}$	cm ² /Vs
P type dopant mobility (cm ² /Vs)	$\infty \pm \text{NaN}$	cm ² /Vs
Fit quality		
R ²	0.99666	
RMSE	0.05414	

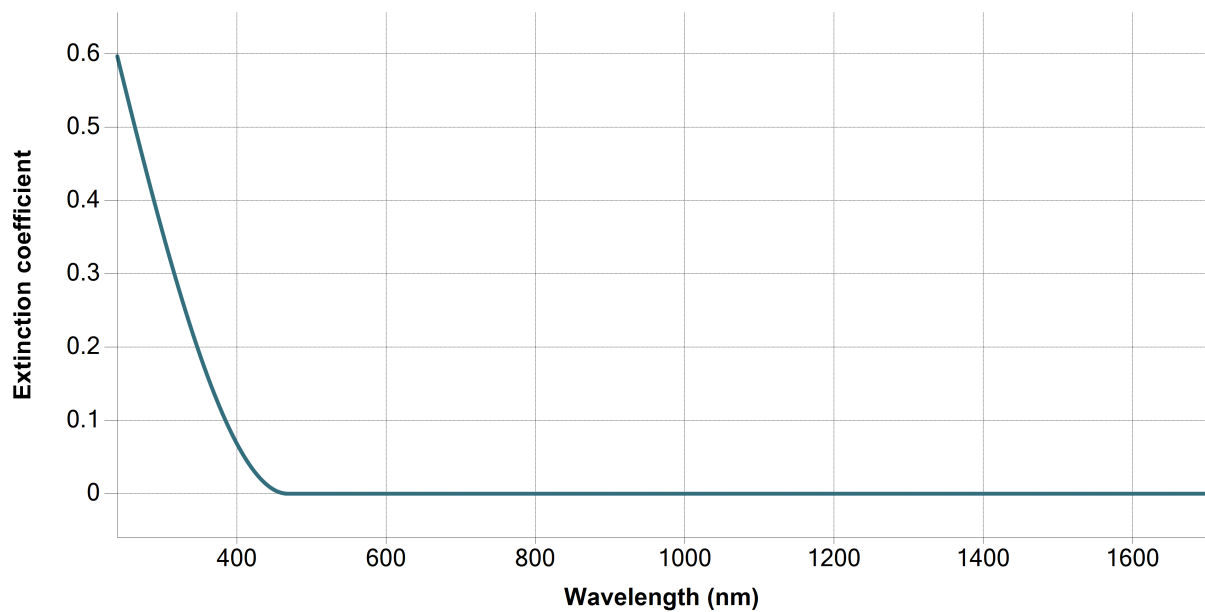
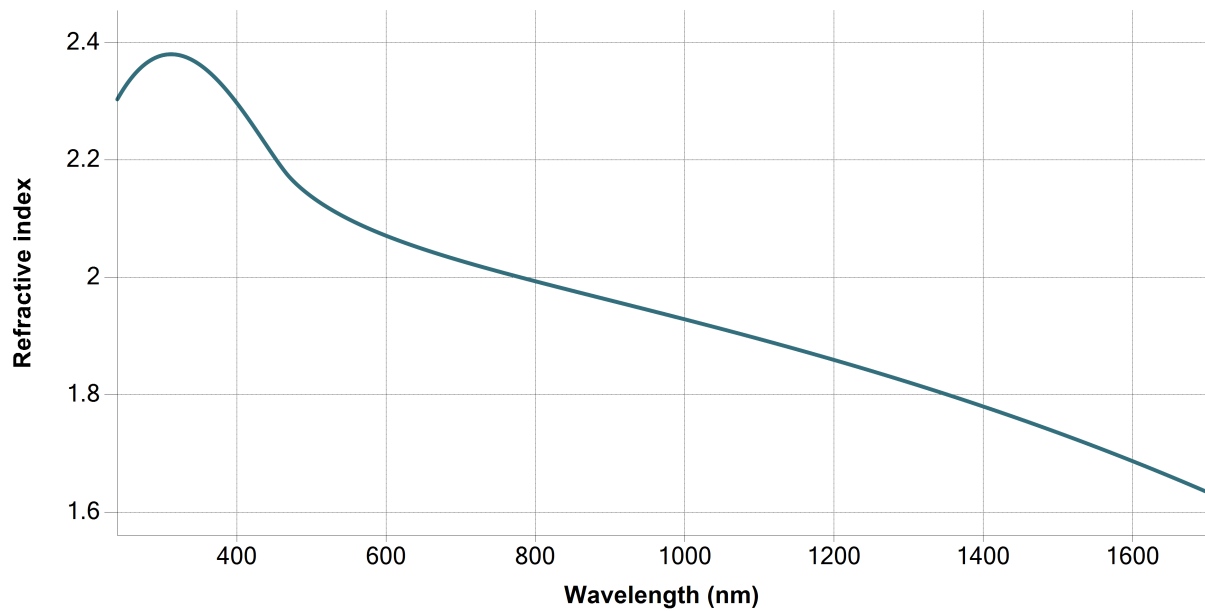
Regression graphs



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	-0.4197	-0.1081	0.0186	-0.1048	-0.0236	-0.102
Ph1 - Bulovic-ITO_tld - Thickness		1	-0.0045	0.0208	0.0283	0.004	-0.305
Ph1 - Tauc-Lorentz[1] - A (eV)			1	0.0869	0.9717	0.8761	0.4578
Ph1 - Tauc-Lorentz[1] - E0 (eV)				1	0.3159	-0.2815	0.3656
Ph1 - Tauc-Lorentz[1] - C (eV)					1	0.7601	0.5009
Ph1 - Tauc-Lorentz[1] - Eg (eV)						1	0.3072
Ph1 - Drude[2] - E_p (eV)							1