

Supporting material

Fabrication of Eco-Friendly Thin Films as Potential Optical Absorber for Efficient Multi-functional Opto-(electronic) and Solar Energy Applications

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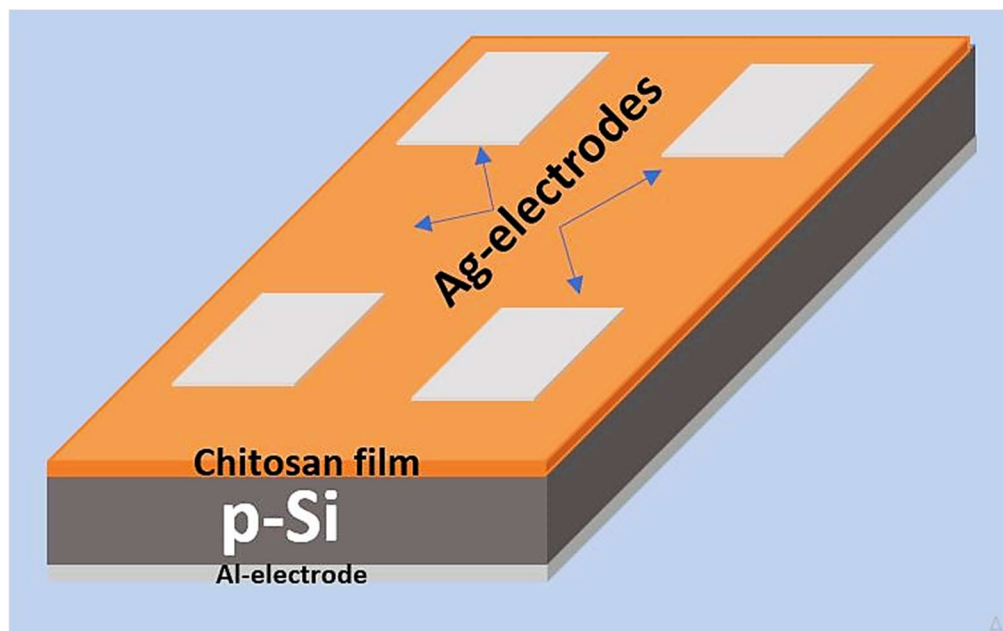


Fig.S1: Schematic diagram of the designed MPS heterojunction.

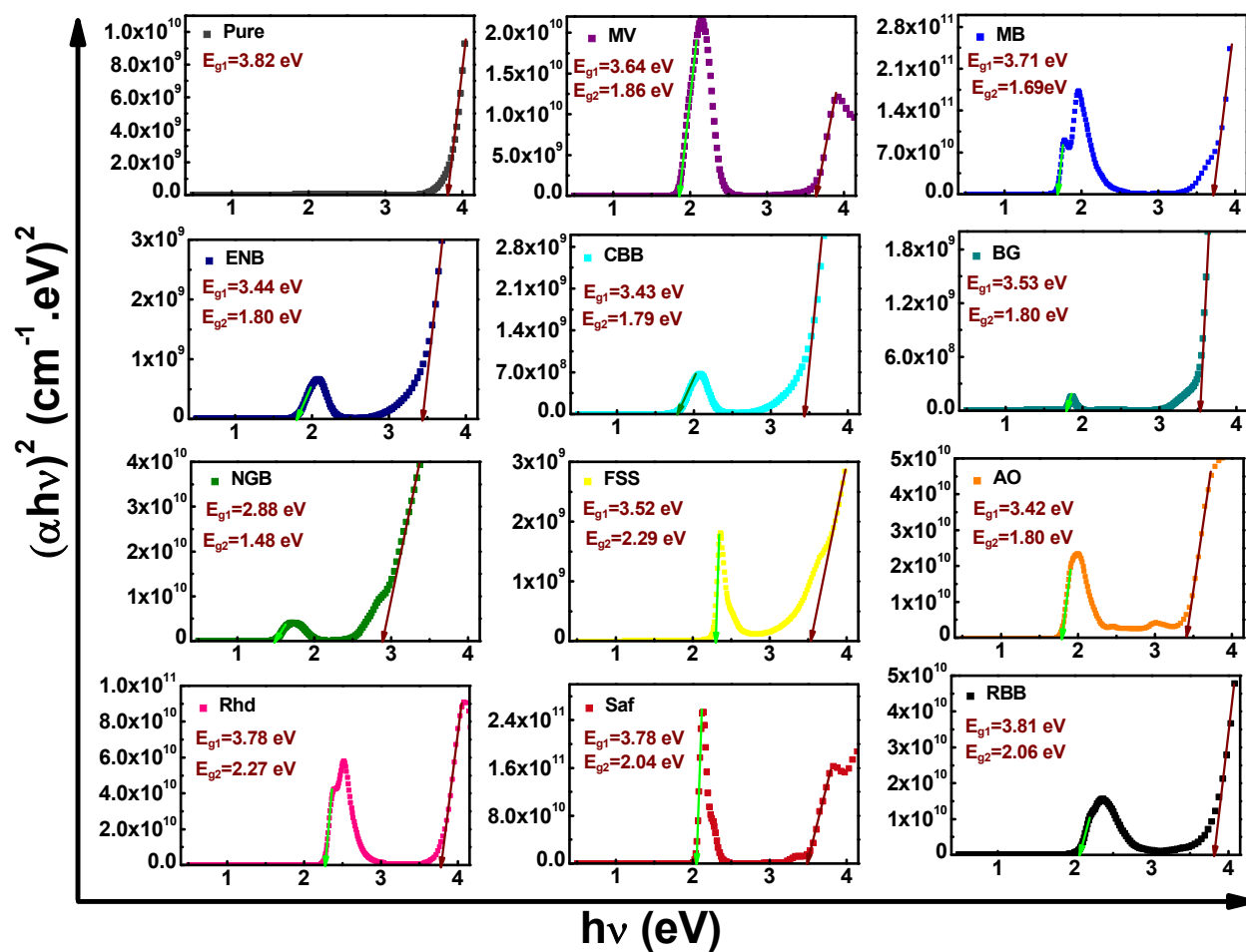


Fig.S2: Tauc plot for energy gap estimation of the pure and dyed chitosan thin films.

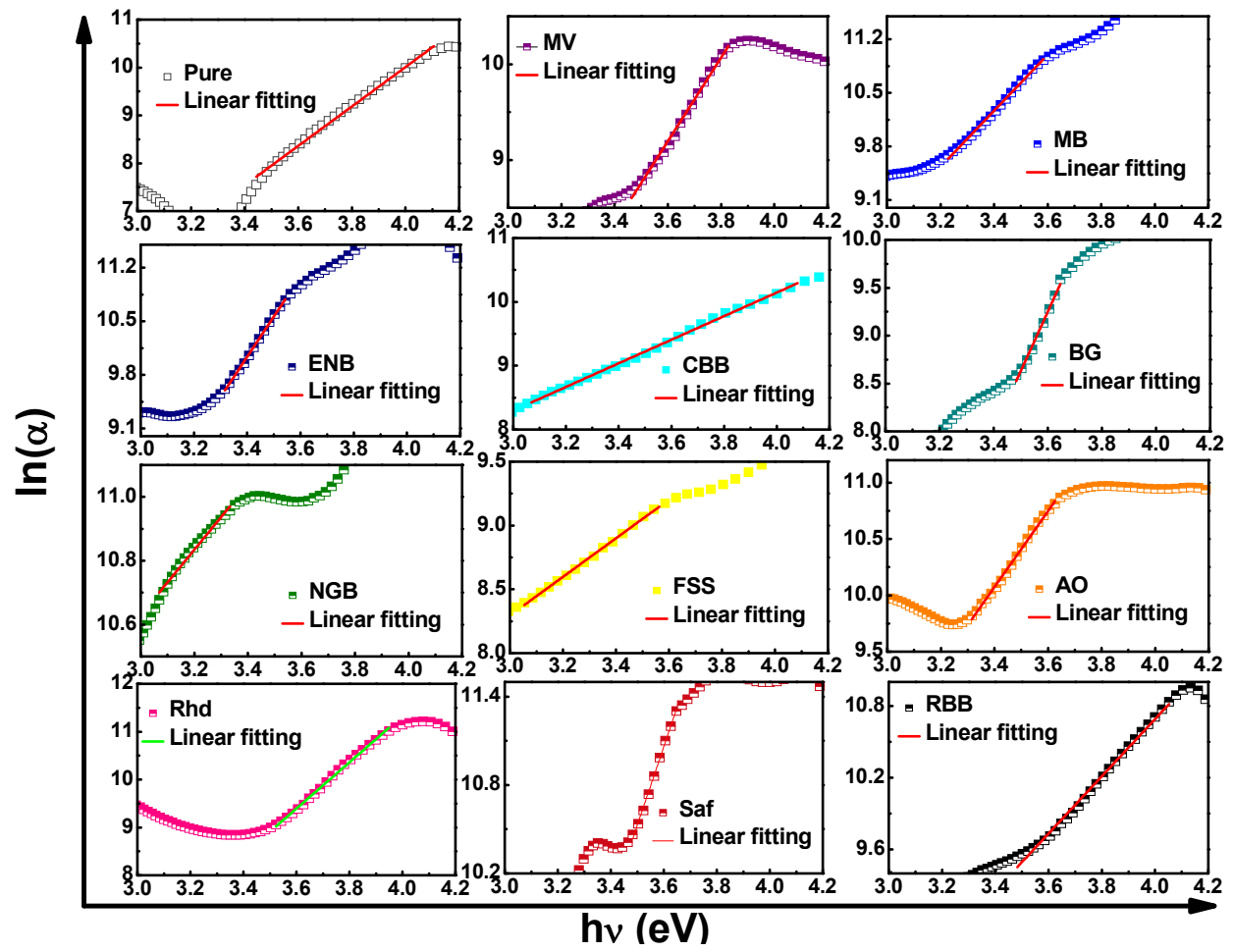


Fig.S3: Urbach plot of the pure and dyed chitosan thin films.

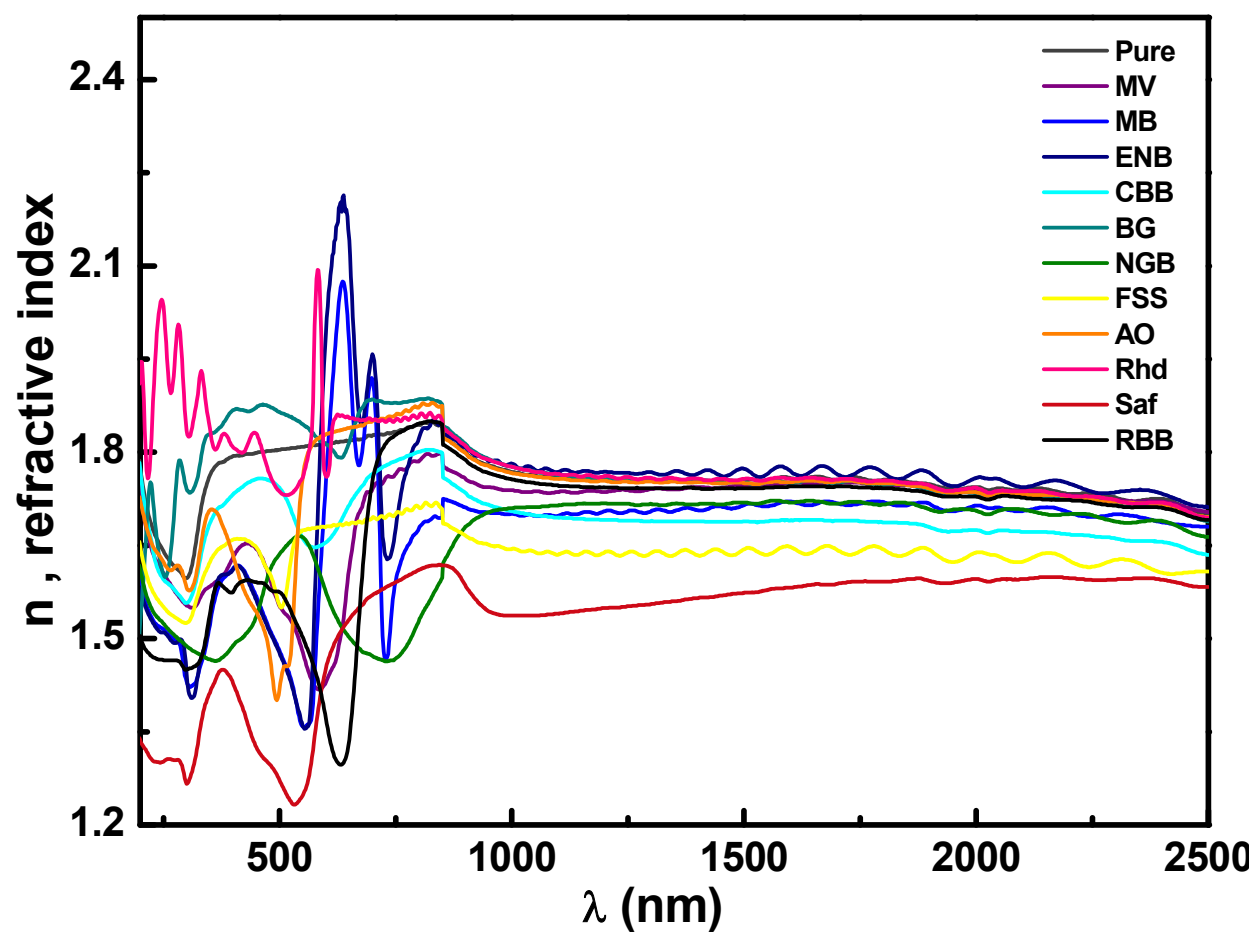


Fig.S4: Dispersion behavior of pure and dyed chitosan thin films.

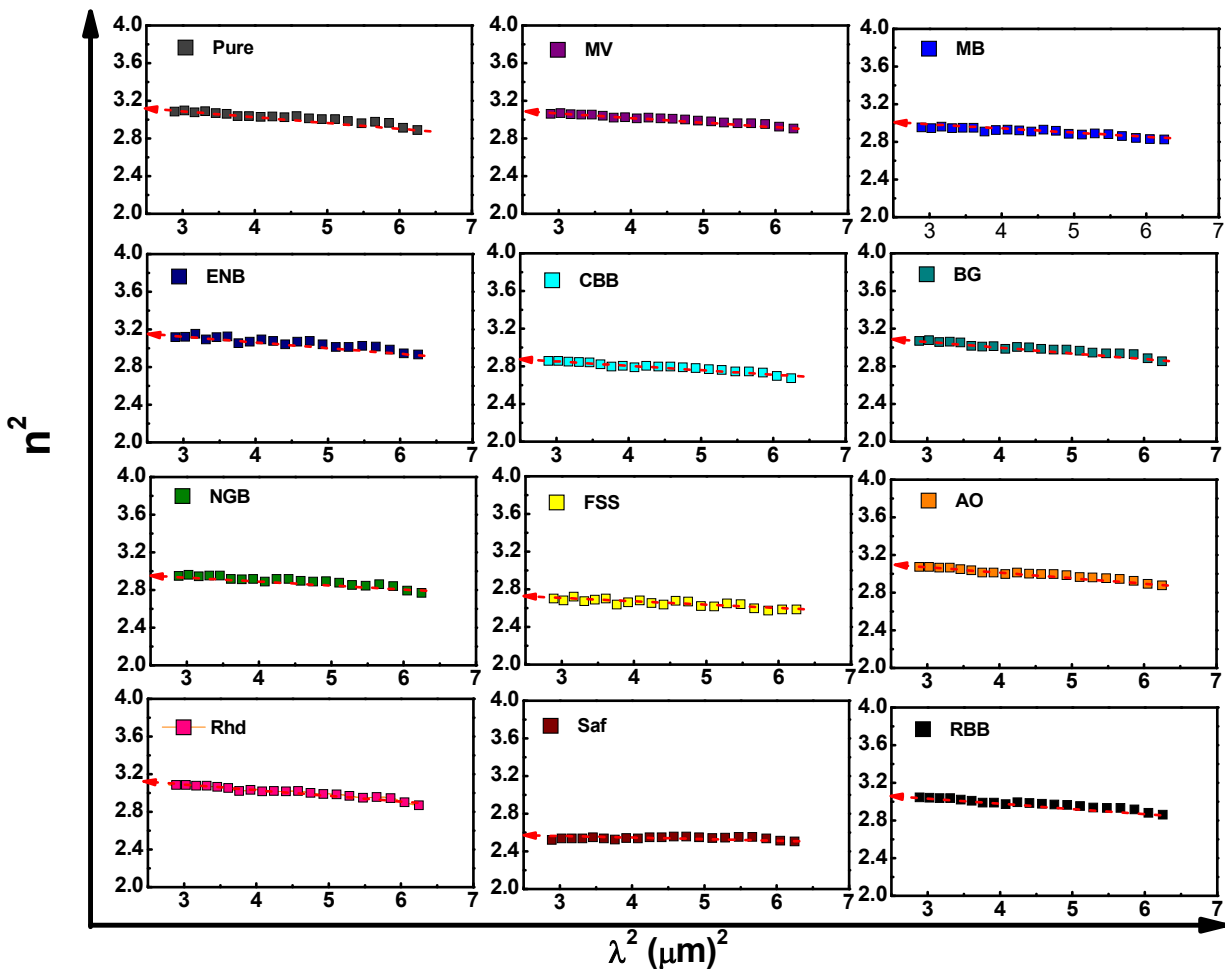


Fig.S5: n^2 versus λ^2 single oscillator model plot of the pure and dyed chitosan thin films.

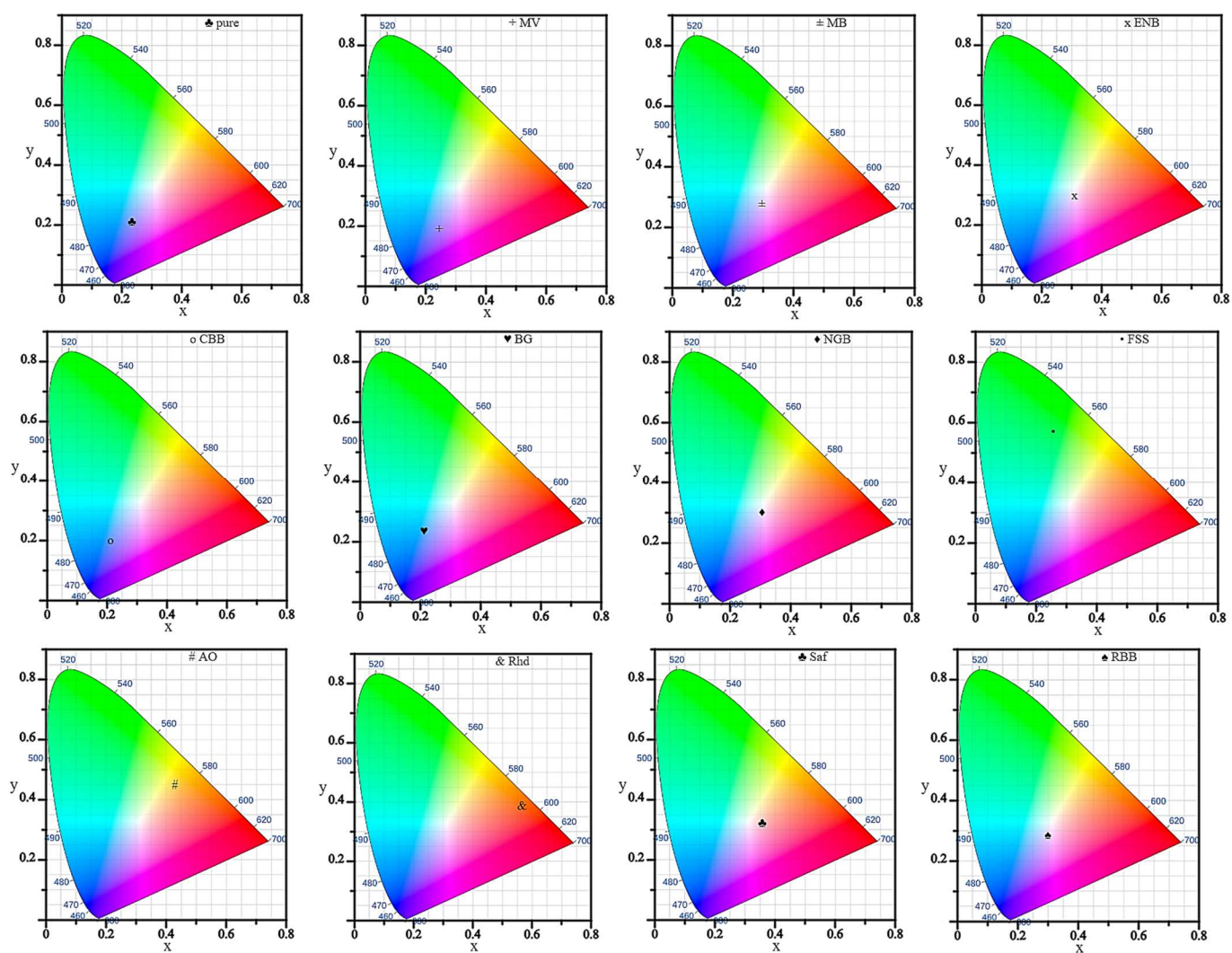


Fig.S6: CIE 1931 chromatography of pure and dyed chitosan thin films.

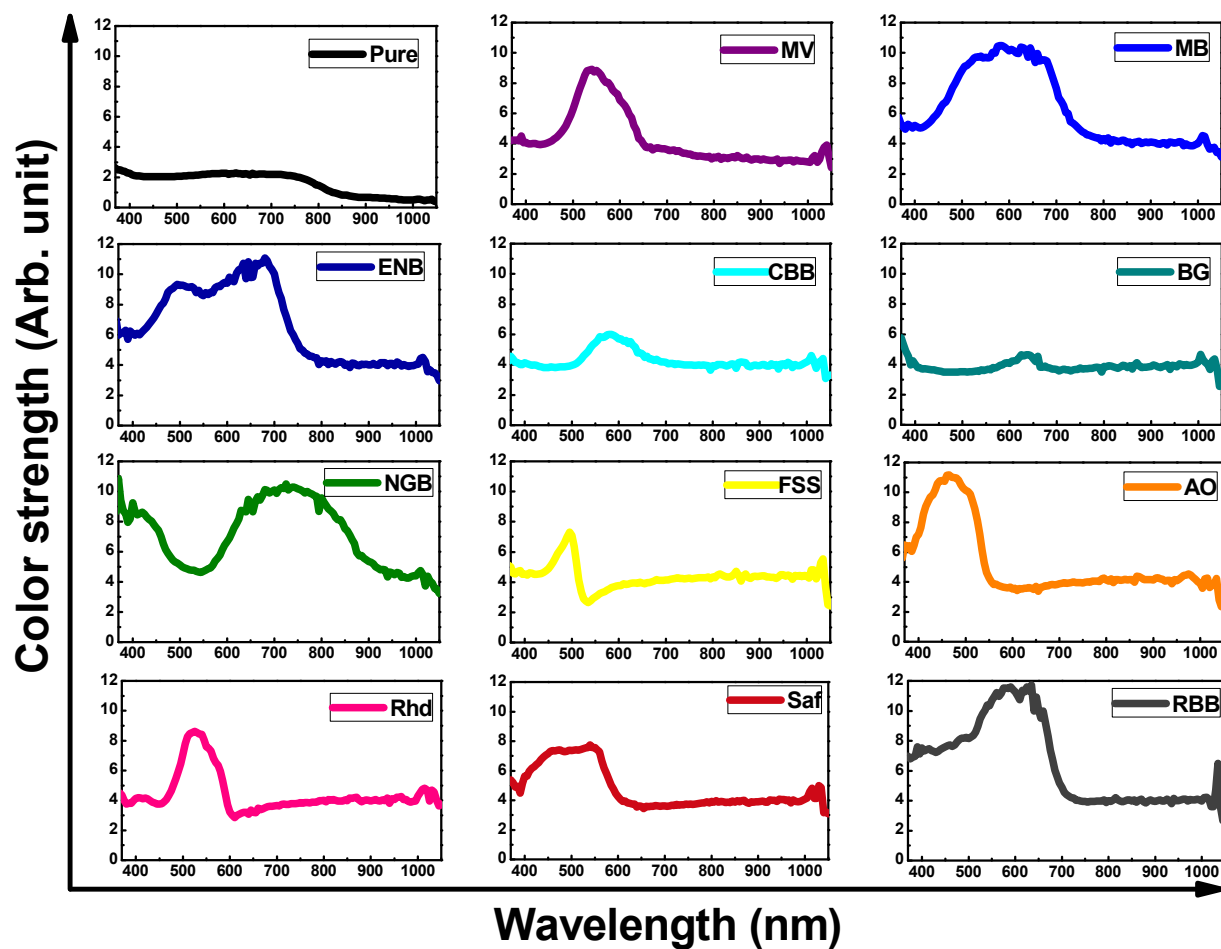


Fig.S7: Spectral profile of the color strength of the pure and dyed chitosan thin films.

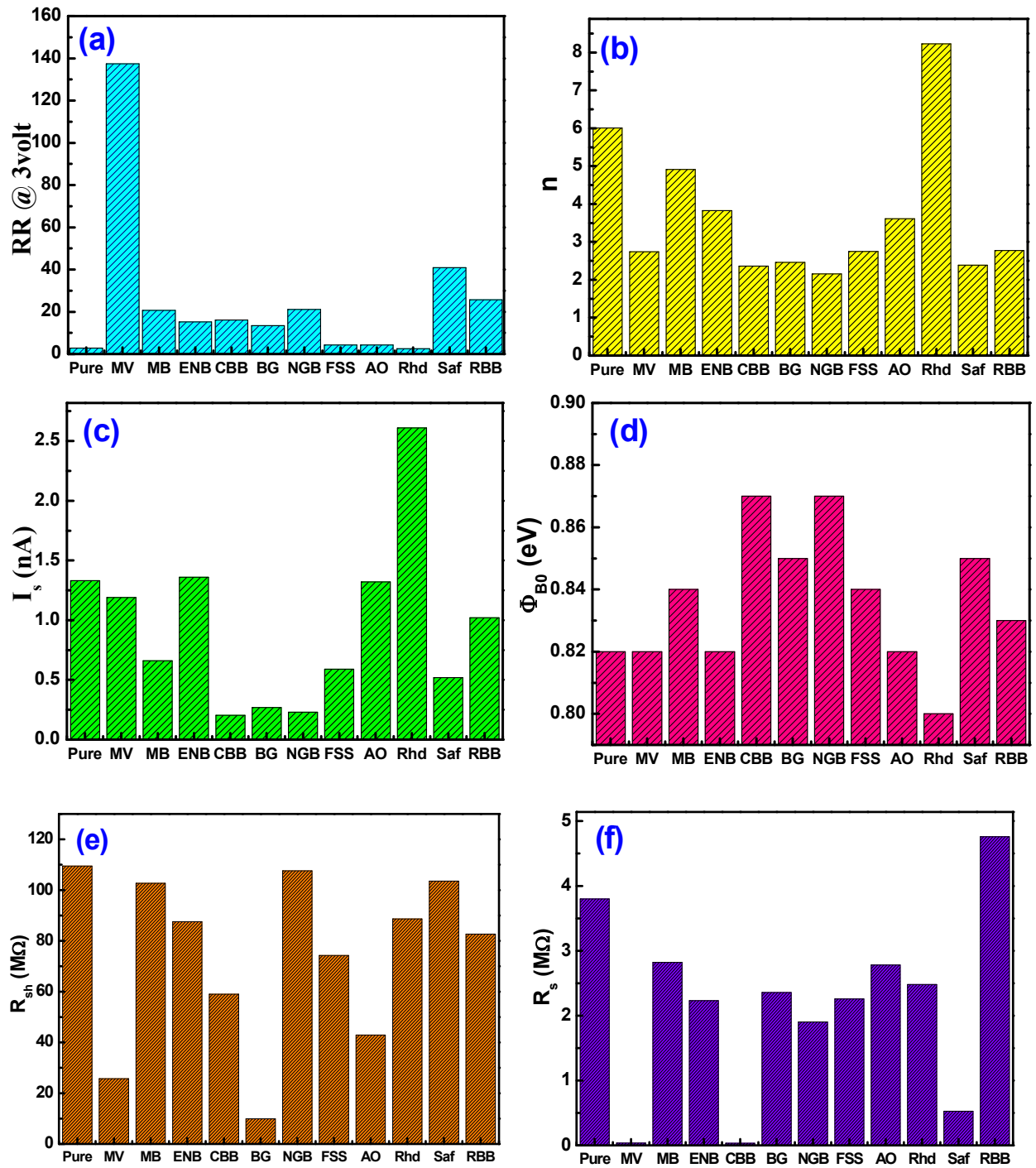


Fig.S8: (a) rectification ratio, (b) ideality factor, (c) reverse saturation current, (d) zero bias barrier height, (d) shunt resistance, and (d) series resistance of Ag/chitosan/p-Si/Al structured devices under dark conditions.

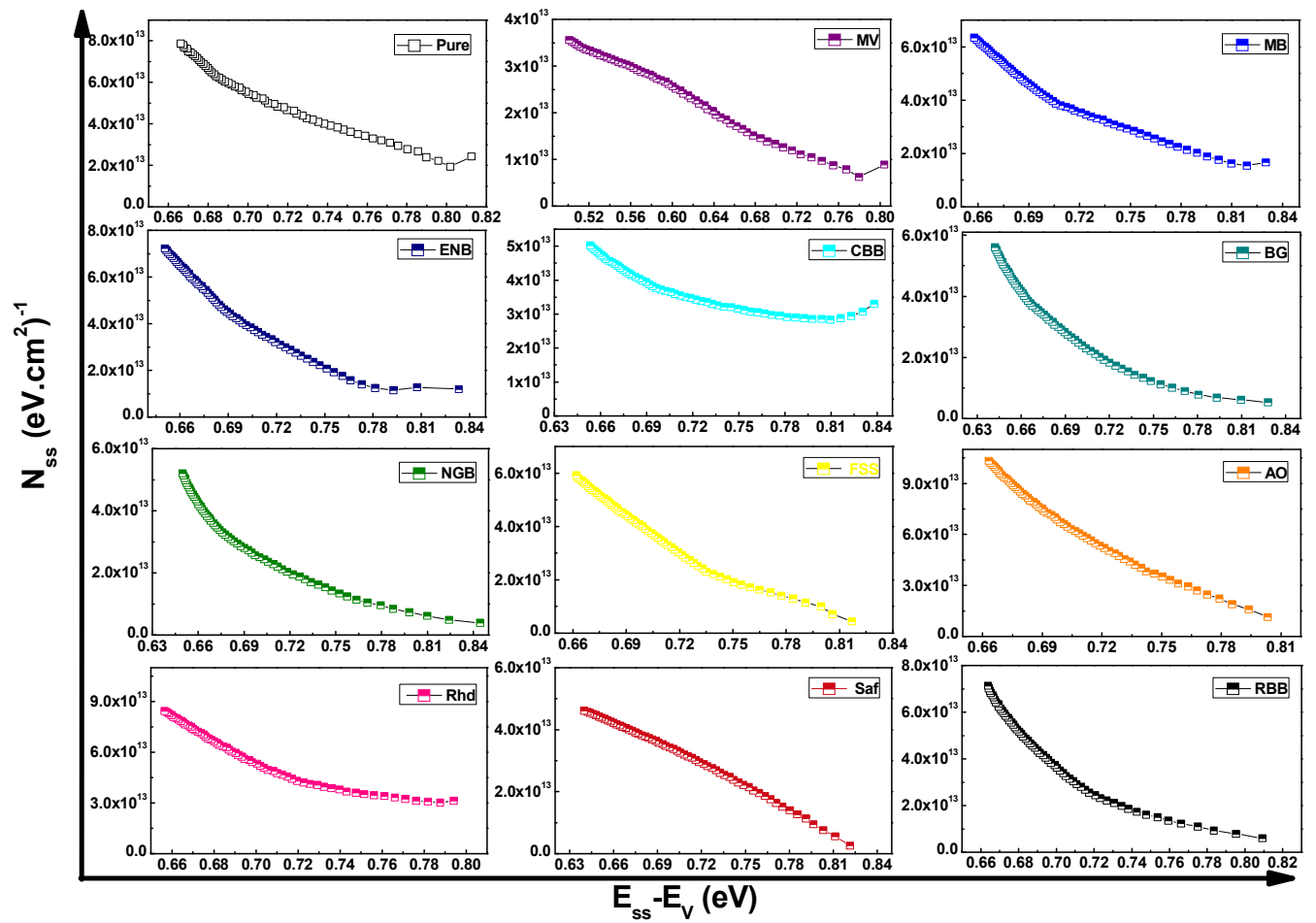


Fig.S9: Interface states density profile of the designed devices.

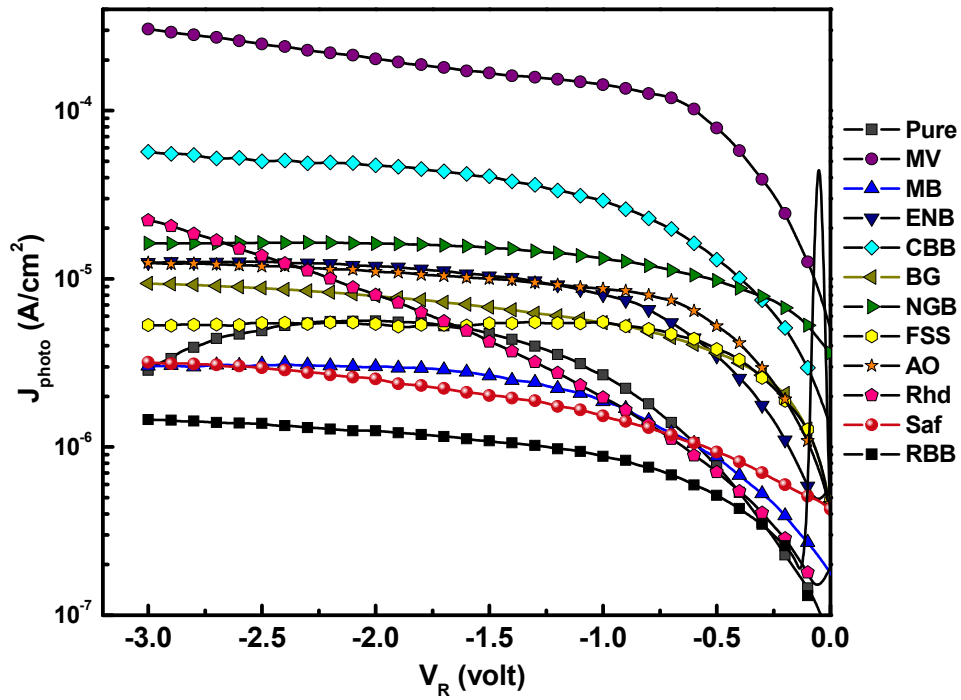


Fig.S10: Reverse photocurrent density under 100 mW/cm² illumination of Ag/chitosan/p-Si/Al structured devices.

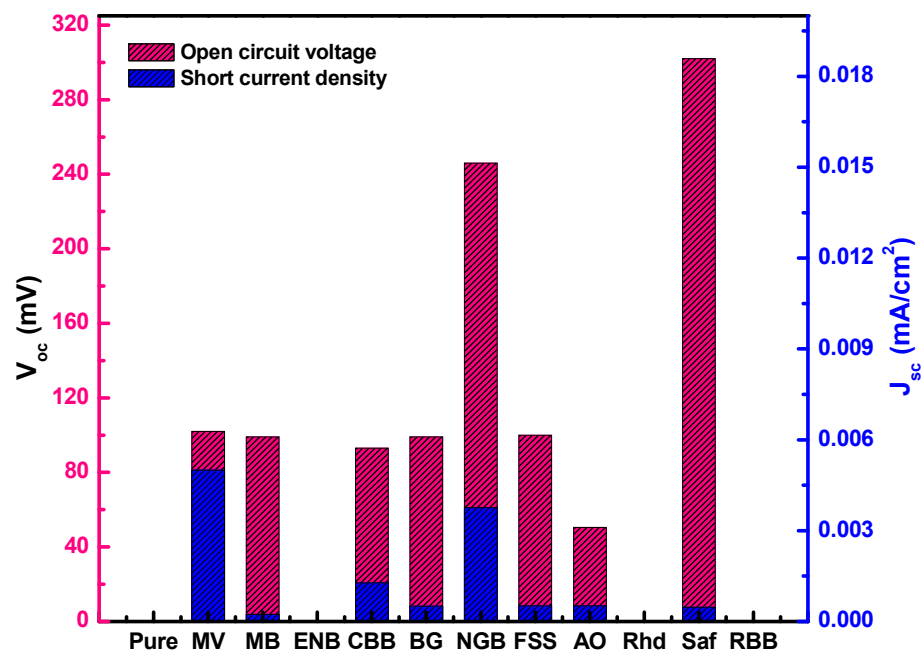


Fig.S11: Open circuit voltage and short circuit current density of Ag/chitosan/p-Si/Al photosensors.

Table.S1: Chemical information about the utilized organic dyes.

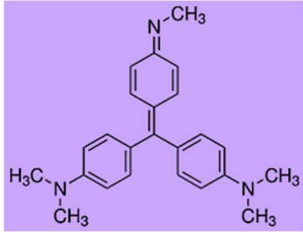
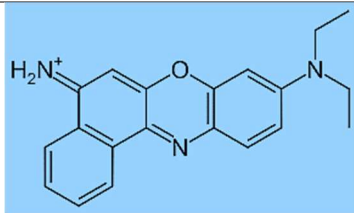
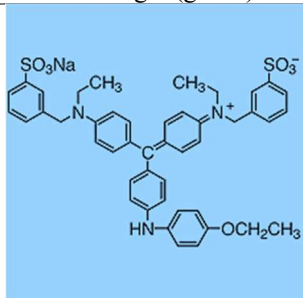
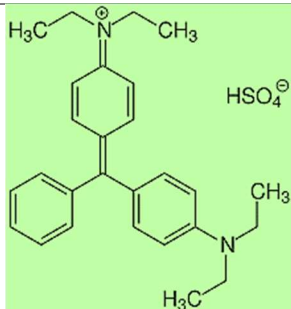
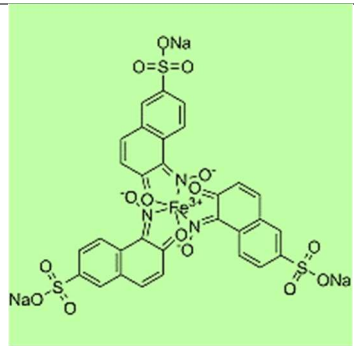
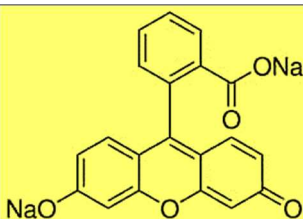
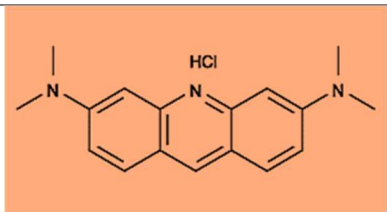
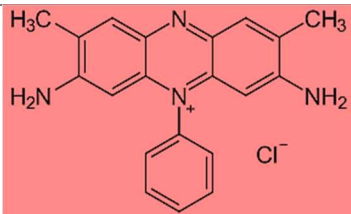
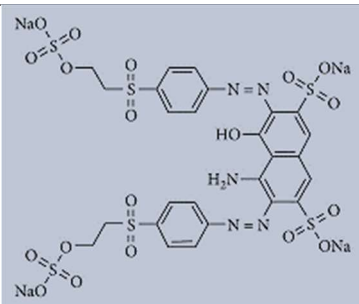
		
Name: Methyl Violet 6B Symbol: MV Molecular formula: $C_{24}H_{28}N_3Cl$ Molecular weight (g/mol): 379.9	Name: Methylene Blue Symbol: MB Molecular formula: $C_{16}H_{18}ClN_3S$ Molecular weight (g/mol): 319.85	Name: Ethyl Nile blue Symbol: ENB Molecular formula: $2(C_{20}H_{20}N_3O)SO_4$ Molecular weight (g/mol): 732.85
		
Name: Coomassie Brilliant Blue R Symbol: CBB Molecular formula: $C_{45}H_{44}N_3NaO_7S_2$ Molecular weight (g/mol): 825.97	Name: Brilliant Green Symbol: BG Molecular formula: $C_{27}H_{34}N_2O_4S$ Molecular weight (g/mol): 482.63	Name: Naphthol Green B Symbol: NGB Molecular formula: $C_{30}H_{15}FeN_3Na_3O_{15}S_3$ Molecular weight (g/mol): 878.46
		
Name: Fluorescent Sodium Salt Symbol: FSS Molecular formula: $C_{20}H_{10}Na_2O_5$ Molecular weight (g/mol): 376.27	Name: Acridine Orange Symbol: AO Molecular formula: $C_{17}H_{19}N_3$ Molecular weight (g/mol): 265.36	Name: Rhodamine 6G Symbol: Rhd Molecular formula: $C_{28}H_{31}N_2O_3Cl$ Molecular weight (g/mol): 479.01
		
Name: Safranin O Symbol: Saf Molecular formula: $C_{20}H_{19}N_4Cl$ Molecular weight (g/mol): 350.84	Name: Remazol Black B Symbol: RBB Molecular formula: $C_{26}H_{21}N_5Na_4O_{19}S_6$ Molecular weight (g/mol): 991.82	

Table.S2: Viscosity coefficient of pure and dyed chitosan solutions.

Solution	Viscosity (Pa. s)	Solution	Viscosity (Pa.s)
Pure chitosan	5.72 ± 0.083	Chitosan + NGB	2.98 ± 0.125
Chitosan + MV	3.81 ± 0.065	Chitosan + FSS	3.62 ± 0.032
Chitosan + MB	3.78 ± 0.127	Chitosan + AO	2.89 ± 0.098
Chitosan + ENB	3.65 ± 0.207	Chitosan + Rhd	3.21 ± 0.079
Chitosan + CBB	2.67 ± 0.122	Chitosan + Saf	3.69 ± 0.011
Chitosan + BG	3.11 ± 0.062	Chitosan + RBB	3.91 ± 0.065

Table.S3: Thickness of the prepared pure and dyed chitosan thin films.

Film	Thickness (nm)	Film	Thickness (nm)
Pure	394	NGB	400
MV	399	FSS	400
MB	401	AO	395
ENB	395	Rhd	350
CBB	400	Saf	403
BG	398	RBB	390