

Supplementary information –

Application of large datasets to assess trends in the stability of perovskite photovoltaics through machine learning.

Bashayer Nafe N Alsulami¹, Tudur Wyn David², A. Essien¹, Samrana Kazim^{3,4}, Shahzada Ahmad^{3,4}, T. Jesper Jacobsson⁵, Andrew Feeney¹, Jeff Kettle¹

1 James Watt School of Engineering, University of Glasgow, Glasgow, G12 8QQ, Scotland

2 School of Natural and Environmental Sciences, Newcastle University, Newcastle upon Tyne, NE1 7RU

3 BCMaterials, Basque Center for Materials, Applications, and Nanostructures, UPV/EHU Science Park, Leioa, Spain

4 IKERBASQUE, Basque Foundation for Science, 48009, Bilbao, Spain

5 Institute of Photoelectronic Thin Film Devices and Technology, Key Laboratory of Photoelectronic Thin Film Devices and Technology of Tianjin, College of Electronic Information and Optical Engineering, Nankai University, Tianjin, China

SI-1 Values used for data analysis

Listed below are the factors used in the datasets. In addition to the factors listed below, numerical values of cell area and optical bandgap was added and a binary assertion of Module (as opposed to cell) and UV filter was applied (TRUE or FALSE)

Substrate	Front electrode	Back electrode	Architecture	Testing condition
PEN	Ag	Ag	Back contacted	IEC 61215
SLG	Ag-grid	Ag	nip	IEC 61646
PAA-PEG	Ag-np	AgAl	nip-mp	Indoor light
PDMS	AZO	Ag-nw	nip-mp-carbon	ISOS-D-1
PEN	Cu-grid	Al	pin	ISOS-D-1I
PES	FTO	Al		ISOS-D-2

PET	Graphene	Au	ISOS-D-2I
PI	ITO	Au	ISOS-D-3
Polyester-satin textile	ITO	AZO-c	ISOS-D-3
SLG	IZO	Carbon	ISOS-L-1
Ti	Ni	Carbon	ISOS-L-1
Transparent wood	PEDOT:PSS	Carbon-nt	ISOS-L-1I
	Ti	CSCNT@SnO2	ISOS-L-2
	Au	Cu	ISOS-L-2I
	Carbon-nt	Cu	ISOS-L-3
	FTO	FTO	ISOS-LC-1
	Graphene	Graphene	ISOS-L-C1I
	ITO	Graphene	ISOS-O-1
	Ti	ITO	ISOS-T-1
		ITO	ISOS-V-1
		IZO	ISOS-V-1I
		Metal	UV-stability
		MWCNTs	
		Ni	
		PEDOT:PSS	
		Pt	
		Sb	
		Al	
		Carbon	
		Carbon-nt	
		Cu	
		Graphene	
		Graphite	
		Mo	
		MWCNTs	

Light source	Bias condition	Atmosphere
Sun	Constant potential	Air
Dark	MPPT	Air. Desiccator
Fluorescent lamp	Open circuit	Ambient
Halogen	Passive resistance	Ar
Indoor light	Short circuit	Dry air
LED		Glovebox
Light		N2
Mercury		N2; O2
Metal halide		Near-space
Natural sunlight		Unknown
Solar simulator		Vacuum
Sulfur plasma		
Tungsten		
UV lamp		
White LED		
Xenon		

TL1	TL2	TL3
2F-SAM	1,2-ethanedithiol	1,2 ethanedithio
2PACz	3-(1-pyridinio)-1-propanesulfonate	5,6,11,12-Tetraphenylnaphthacene
4-methoxythiophenol	AgInS2-QDs; TiO2-c	Al2O3-c
5,6,11,12-Tetraphenylnaphthacene	Ag-np	Al2O3-c
Ag-np	Al2O3-c	Al2O3-mp
Ag-nw	Al2O3-mp	Al2O3-np
Al-np	APTES-SAM	Aminocaproic acid
Aniline; rGO	Au-nw	Aminocaproic acid; Caproic acid

Au-np	AZO-mp	Au@SiO ₂ -np
AZO-np	B2Cat2	Au-np
BaCoF ₄	Ba(La)SnO ₃	BaTiO ₃
BCP	BBA	beta-Alanine-SAM
BDT-POZ	bis-PCBM; DMC	BSO-mp
BDT-PTZ	BrBA	C ₆₀
BenMeIM-Cl	BZnTPP	C ₆₀ -SAM
Bphen	C ₆₀	Carbon-QDs
BTF1	C ₆₀	Carpoic acid
BV-FNPD	C ₆₀ -NH ₂	CaTiO ₃ -c
C ₆₀	C ₆₀ -SAM	CBA-SAM
C ₆₀ -SAM	C ₉	CdS
Carbon-np	Carbon-QDs	CsI
CdS	Carbon-QDs	CuSCN
CdSe	CDIN	Dex-CB-MA
CeO _x	CdS	ETPM
CF-Sp-BTh	C-PCBSD	Graphen Oxide
Cobalt-porphyrin	CPTA	Graphene oxide
CoCuO	CsCO ₃	HOOC-Ph-SH
CoO _x	CuGaO ₂	Li-GO
CPTA	CuGaO ₂ -c	MBA-SAM
CrO _x	CuGaO ₂ -mp	MoO ₃
Cu ₃ PS ₄ -np	CuInS ₂ -QDs	MoS ₂
CuAlO ₂	CuZnS	MPTS-SAM
CuCo ₂ O ₄	D35	N719 dye
CuCrO ₂	Dompamin-SAM	NaYF ₂ @SiO ₂ -np
CuI	DPC60	NBA-SAM
CuInS ₂	DTPA	NH ₄ I
CuO _x	EMIM-PF ₆	NiO-c
CuPc	EPA	NiO-np
CuSCN	F4-TCNQ	PbSe

CuS-np	Graphene	PbTiO ₃
CzPAF-TPA	Graphene; Al ₂ O ₃ -mp	PCBM-60
DBFMT	Graphydine-QDs	PCBM-60; PMMA
DBTMT	Heparin-Na	PCBM-60; Poly(N-vinylcarbazole)
DFTAB	Hexamethylenetetramine	PEDOT:PSS
DMZ	ICBA	PEI
DNA-CTMA	ImAcHcl	PFN
F6-TCNNQ	KCl	SbI ₃
FB-OMeTPA	LiF	SiO ₂ -mp
Fe ₂ O ₃	MCA	SnO ₂
Fe ₂ O ₃ -mp	MgO	SnO ₂ -c
FT-OMeTPA	MgO-EA	SnO ₂ -np
GO-nanoribbons	MoS ₂	TiN
Graphene	MSAPBS	TiO ₂ -c
Graphene oxide	NAMF-Br	TiO ₂ -mp
Graphene; NDI; SnO ₂ -np	NAMF-Cl	TiO ₂ -np
Graphene-QDs	NAMF-H	Trimethylamine oxide
HfO ₂	NiO-c	ZrO ₂ -mp
HTM-2 (bifluorenylidene-based)	NiO-mp	PCBM-60
IDIC	NPC60 OH	PFN
In ₂ O ₃	OEABS	(blank)
In ₂ O ₃ -c	OTES:APTES-SAM	
LiCoO ₂	PASP	
LiMgNiO-c	PbPc	
LiNiO-c	PCBA	
MeO-2PACz	PCBB-2CN-2C8	
Mg _{0.1} Zn _{0.9} O-np	PCBM-60	
m-MTDATA	PCBM-60; PMMA	
MoO ₃	PCBSD:GD	
MoOx	PEDOT:PSS	

MoS2	PEI
MoS2	PFN
MPA-BTTI	PFN-Br
MSAPBS	PFN-P1
MTDATA	PFN-P2
N,N-di-p-methylthiophenylamine	PMMA
Nafion; PEDOT:PSS	PN4N
Nb2O5	PolyTPD
NbOx	PPDI-F3N
NDI-P	PS
NiCo2O4	PSS-Na
NiMgLiO	PTAA
NiMgLiO-c	PTFTS
NiMgO	rGO; Zn2SnO4-fiber
NiO	Rubrene
NiO-c	SAED
NiO-mp	Si-nw
NiO-nanowalls	SnO2
NiO-np	SnO2@TiO2-np
NO-Graphene-QDs	SnO2-c
NPB	SnO2-mp
NPB; PTAA	SnO2-nanosheets
nTi-MOF	SnO2-np
Oxo-Graphene	Spiro-TBB
P3Ct	SrGO
P3CT-K	SrTiO3-mp
P3CT-N	SWCNTs; TiO2-mp
P3CT-Na	SY1
P3HT	SY2
PANI	SY3

PASQ-IDT	SY4
PB2T-O	TaTm
pBDT-BODIPY	Ti
PBT	TiO ₂ ; CoCr-mp
PbZrTiO ₃	TiO ₂ -c
PCBM-60	TiO ₂ -mp
PCP-Na	TiO ₂ -mp; YVO ₄ :Eu:Bi-np
PEDOT:LS	TiO ₂ -nanofibers
PEDOT:PSS	TiO ₂ -nanoflowers
PEDOT:PSS; PEG	TiO ₂ -np
PEDOT:PSS; PEI	TiO ₂ -nw
PEI	TiS ₂
PEIE	TPI-6MEO
PFB	TPTPA
PFN	V ₂ O ₅
PFO	WO _x
PhNa-1T	WPF-6-oxy-F
poly(1,4-phenylenevinylene)	ZIF-8
PolyTPD	Zn ₂ SnO ₄ -fiber
Porphyrin	Zn ₂ SnO ₄ -mp
p-PFP-O	ZnO-mp
PTAA	ZnO-nanodisks
PTB7	ZnO-nanofibers
PTCA	ZnO-nanowells
PTEG-1	ZnO-np
PTPD	ZnO-nw
PVK	ZnOS
PyCEE	ZnP _{triazine} (gly) ₂
rGO	ZnSO ₄ -mp
r-GO-HBS	ZnTiO ₃ -mp

Si-OMeTPA	ZrO ₂ -mp
SnO ₂	ZTO
SnO ₂ -c	CuPc
SnO ₂ -nanosheets	PEDOT:PSS
SnO ₂ -np	PEDOT:PSS
SnO ₂ -np	SnO ₂ -np
SnO ₂ -QDs	ZnO
SnS ₂	
Spiro-MeOTAD	
Spiro-TBB	
SrGeO ₃	
SrTiO ₃	
SrTiO ₃ -c	
SY1	
SY2	
SY3	
SY4	
TAE	
TAPC	
TaTm	
TB(MA)	
TCl-PDI	
TFB	
TFM	
Ti ₃ C ₂	
Ti ₃ C ₂ Tx	
TiO ₂ -c	
TiO ₂ -macroporous	
TiO ₂ -mp	
TiO ₂ -np	
TiO ₂ -nw	
TiS ₂	
TPA-BP-OXD	
TPE-S	
TP-FTzF-TP	
TS-CuPc	
TTA	
V1036	
VB-MeO-FDPA	
VOx	
WOx	
WS ₂	
X1	
XY1	

Zn₂SnO₄
 ZnO
 ZnO
 ZnO-np
 ZnSO
 ZTO
 SnO₂-c
 TPA-PT-C6

TL4

(4AMP)I ₂	CuInS ₂ @ZnS-QDs	MoO ₂ -np	PTTI-2
(CH ₃) ₃ SPbI ₃	CuInS ₂ -QDs	MoO ₃	PTZ-TPA
(DTYM-NDI-DTYA) ₂	CuInSe ₂ -QDs	MoS ₂	PVAc
(OctPhO) ₈ CuPc	CuMe ₃ 2c	MoS ₂ -QDs	PVP
(OctPhO) ₈ ZnPc	CuMePc	MoS ₂ -QDs; rGO-flakes	Py-C
[BMMIm]Cl	CuO ₂	mp-SFX-2PA	Py-OMe
[BMPA-BTD]3-TPA	CuP		PZn-2FTPA
[BMPA-EDOT]3-TPA	CuPc	N2200	Q10
[Fe(bpyPY ₄)](OTf) _{2.5}	CuPcNO ₂ -OPh		RCP
18-crown-6 ether	CuPc-OBu	NaYF ₄ :Yb:Er-np	RCP-BTT
1-adamantylamine	CuPc-OTPA _t Bu	Nb ₂ O ₅	Red Phosphorous-QDs
1-adamantylamine hydrochloride	CuPrPc	N-CuMe ₂ Pc	rGO
	CuPs-TIPS	N-CuMe ₂ Pc; P3HT	rGO-4FPH
	CuS	NDI ₃ HU-DTYM ₂	rGO-flakes
2,6-Py	CuSCN	NDI-ID	S,N-Heteroacene 1
2,7 BCz-OMeTAD	CuSeCN	NDI-ID(RR)	S,N-Heteroacene 2
2,7-triphenylamine-carbazole	CW4	NDI-ID(RS)	S,Si-heteropentacene
2-acetylpyridine		NDI-PM	S12
2-aminoterephthalic acid	Cytop	NDP-V	S14
2FBTA-2	Cz-OMeTAD	NH ₂ -POSS	S5
2-HI-PVK	CzPAF-SBF	NiCo ₂ O ₄ -np	SAF-5
2H-MoS ₂	CZ-STA; CZ-TA	NiO	SAF-OMe
2mF-X59	CZ-TA	NiO-c	Selenium
2-MP	CZTPA-1	NiO-mp	SFXDAnCBZ
2PDI-OS	CZTPA-2	NiO-np	SGT-405
2TPA-2-DP	DAHI	NiPc	SGT-410
2TPA-4-DP	DAI	NMPFP	SGT-411
3,6 BCz-OMeTAD	DBC-OMeDPA	NP-SC6-TiOPc	SiPc-Py-2
3,6-cbz-EDOT	D-C60	OAI	Si-QDs
3,6-triphenylamine-carbazole	DCZ-OMeTAD	OCA	SM
3-acetylpyridine	DCZ-OMeTPA	ODA-FeS ₂ -np	SM09

3-Butylthiophene	DDOF	OIPC-I	SnO ₂ -c
3-Dodecylthiophene	Decaphenylcyclopentasilane	Oleic-acid	SnS
3-Ethylthiophene	DEPT-SC	Ome-DPA-CuPc	SnS-np; ZnS-np
3-Hexylthiophene	DERDTS-TBDT	OMe-TATPyr	SP-01
3-hydroxypyridine	DFBT(DTS-FBTTh ₂) ₂	OMeTPA-BDT	SP-02
3-Methylthiophene	DIPO-Ph ₄	Ome-TPA-CuPc	SP-12
	DIQ-C12	OMeTPA-DPP	Spiro-MeOTAD
	dly-1	OMeTPA-FA	Spiro-MeOTAD:P3HT
	dly-2	OMeTPA-TPA	Spiro-MeTAD
	DM	OTPA-ZnPc	Spiro-OBuTAD
	DMEC-60	P(BDTS-SePPD)	Spiro-OEtTAD
4-acetylpyridine	DMEC-70	P(BDTS-tPPD)	Spiro-OiPrTAD
4-chlorothiophenol	DORDTS-TFBT	P(BDTS-ttPPD)	Spiro-OMeOTAD
4-DMABA	DPA-ANT-DPA	P(NDI ₂ DT-TTCN)	Spiro-OprTAD
4-HI-PVK	DPA-QA-DPA	P(NDI ₂ OD-T ₂)	SrCl ₂
	DPPS	P1	
A101	DR3T	P1Z1	SWCNTs
A102	DR3TBDTT	P2	TAPC
ACE-ANT-ACE	DR3TBDTT; PDMS	P3	TaTm
ACE-QA-ACE	DTB	P3HT	TBC
ACR-TPA	DTBT	P3HT	TBC-1
ADAHCl	DTS	P3HT; SWCNTs	TBC-2
ADAHI	EDOT-OMeTPA	P3HT-MoS ₂	TCPBr
Adamantane	EH44	P3TAA-co-P3HT	TCPI
a-DMEC70	EHCz-2EtCz	P4	TCP-OC8
Al ₂ O ₃	EHCz-3EtCz	P6	TCP-OH
Al ₂ O ₃ -c	EHCz-MeFl	PANI	TDT-OMeTAD
Alkoxy-PTEG	EtheneDTPA	PB(NAP-Th)TBT	TEACl
Aminothiazolium iodide	EtheneTTPA	PBDB-T	TET
AQ310	EVA	PBDT(2F)T	TFAP
AS37	F1	PBDTT	TFB
asy-PBTBDT	F16CuPc	PBDTTT-CT	TFDIB
AZ1	F2	PbPc	Theophylline
AZ2	F23	PbS-QDs	Thiophene
AZO-mp	F3	PBT1-C	Th-PDI
B1	F4-TCNQ	pBTT	Ti
B186	FA-CN	PBTTT-14	TiO ₂ -c
B2	FA-PDI2	PC61BEH	TiO ₂ -mp
B3	FBA2	PCA-1	TiO ₂ -np
BAI	FBA3	PCBB-OEG; PCBM-60	TiS ₂ -np
BCP	FDT	PCBM-60	Titanylphthalocyanine
BCP; PCBM-60	Fe ₃ O ₄ -np	PCBM-60; F8TBT	TMPA-Cl
BDTOFMeDPA	FEH	PCBM-60; Graphene	TMTA
BDT-4MeOTPA	F-graphene; P3HT	PCBM-60; ICBA	TOPO
BDT-C1	FNCA	PCBM-60; PCDTBT	TP1
BDTS-2DPP	FTA2	PCBM-60; Sb-Carbon-	TPA-3CN

		nw	
		PCBM-60; Zn0.8Cd0.2S-	
BEDN	FU7	np	TPA-ANT-TPA
Benzylamine	Fullerene-2a	PCBM-60; ZnO-np	TPA-BPFN-TPA
BF002	Fullerene-2b	PCBM-70	TPA-BP-TPA
BF003	Fullerene-2c	PCBM-70; PTB7-Th	TPA-BPV-TPA
Bi2Te3	Fulleropyrrolidinium Iodide	PCDTBT	TPA-CN
Black phosphorous	G2	PCDTBT1	TPA-Pc
BMIMBF4	Graphene	PCDTBTB	TPA-QA-TPA
BP	Graphene oxide	PCPD2FBT:BCF	TPA-TPM
Bp-OMe	Graphene oxide; NiO-c	PCPDTBT	TPB(2-MeOTAD)
BT	Graphene; P3HT	PCTDI	TPB-2-MOTPA
BTBDT	Graphene; TSHBC	PD-10-DTTE-7	TPD
BT-BTH	Graphene-QDs	PDBT-co-TT	TPD-4EtCz
BTDTP	Graphitic carbon nitride	PDCBT	TPD-4MeOTPA
BTF1	H:MoO3	PDIN	TPD-4MeTPA
BTPA-6	H101	PDI-T	TPDI
BTPA-TCNE	H111	PDI-V	TPE-DPP16
BTTI-C6	H112	PDMS	TPE-DPP4
C101	H-2,5	PDPP3T	TPE-ISO4
C102	H-3,4	PDPPDBTE	TPE-PDI4
C12H10B2O4	H6Bu-ZnPc	p-DTS(FBTTh2)2	TPE-TPA-8A
C13-FAS	HATNASOC7-Cs	PEA2PBI4	TPE-W1
C5-NCMA	H-Bi	PEAI	TPE-W2
C60		PEDOT	TPE-W4
C60; C70	HL-1	PEDOT:PSS	TPFPB
C60; PCBM-60	HL-2	PEH-3	TQ1
C60; PDI	HOFP	PEH-8	TQ2
C60-BPy	HS-Ph-CN	PEH-9	Triazine-Ph-OMeTPA
C60-MPy	HTM		Triazine-Th-OMeTPA
C60-SAM	HTM1	Pentafluorobenzenethiol	TRUX-E-T
Carbon Black	HTM-1	PEO	TSHBC
Carbon black;			
Graphite	HTM-2	Perovskite	TTC
Carbon;	HZ1	Perovskite-QD	TTE-1
Carbon; MAI	HZ2	PF8-TAA	TTE-2
Carbon-epoxy	H-Z2	PFB	TTF1
Carbon-nt	HZ3	PffBT4T-2OD	TTPA-OMeTPA
Carbon-nt; P3HT	ICBA	PFPDI	V1000
Carbon-QDs	IDF-SFXPh	PhCz-4MeOTPA	V1004
CAS	IDIC	Phosphor-QDs	V1012
CdI2	IDT1	PHPT-py	V1013
CdSe-QDs; PCBM-60	IDT2	Ph-TPA-2A	V1021
CdS-np	IDT6CN-4F	Ph-TPA-4A	V1091
CdZnSe@ZnSe-QDs	IDT6CN-TM	Ph-TPA-6A	V1160
CdZnSeS-QDs	IDTC4-TPA	PIF8-TAA	V1207
CeOx	IDTC6-TPA	PMMA	V1209
CeOx-np	IDT-TPA	PN	V1221

CGS	IDTT-TPA	PNDI-2T	V1225
Choline chloride	IEICO; PBDTTT-E-T	PN-F25	V873
CIGGSe-np	IEICO-4F	PN-F50	V885
CIGS-np	Imidazolium iodide	Poly(ethylene oxide)	V886
Co ₃ O ₄	In ₂ O ₃ -c	Poly(TA)	V911
Co-Porphyrin	IPFB		V950
Co-porphyrins	IT-4F		WO3
COPV1	IT-4F; PBDB-T-SF		WT3
COPV4	IT-4H	Polyimid	X2
COPV7	IT-4M	Poly-N-vinylcarbazole	X51
COTT-1	ITCP-M	Polystyrene	X55
CPTA-E	ITCPTC	PolyTPD	X61
Crosslinked TCTA-BVP	ITCPTC-Se	PO-Spiro	X62
CsBiBr ₃ -QDs	ITCPTC-Th	POSS-NH ₂	XPP
CSCNT@Al ₂ O ₃ -c	ITIC	POSS-SH	XY1
CsCuBr ₃ -QDs	ITIC-Th	POZ10	Y4
Cs-oleate	J1	POZ6-2	YC-1
CsPbBr ₃ -np	J2	POZ9	YC-2
CsPbI ₃ -np	J61-ITIC	PPDI	YC-3
CsSnBr ₃ -QDs	JK-216D	PPDT2FBT	YD2-o-C8
CsSnBr ₂ -QDs	JY5	PPEA	Yih-2
CsSnI ₃ -QDs	JY7	pPh-2MODPACz	YK1
CT1	KR321	PPy	YK2
CT2	LiF	PPyra-ACD	YKP03
CTAB	M101	PPyra-TXA	YN1
Cu:NiO-np	M102	PPyra-XA	YN2
Cu ₂ O	M103	PS	YN3
Cu ₃ SbS ₄ -np	M104	P-SC6-TiOPc	YT1
CuCrO ₂	M3	PSQ2	YT2
CuCrO ₂ -np	M3; PCBM-60	PT3HT	YT3
CuEtPc	M4	PTA	Z1
CuFeO ₂ -np	M4; PCBM-60	PTAA	Z1011
CuGaO ₂	mDPA-DBTP	PTAA; Spiro-MeOTAD	Z1012
CuGaO ₂ -np	Me ₄ NBr	PTB7	Z25
CuI	ME6Bu-ZnPc	PTCDA	Z26
CuIn _{1.5} Se ₃ -QDs	MEH-PPV	PT-DC	Z28
CuInS	Mix-DMEC70	PTQ10	Z29
	MnS	PTTI-1	Z30
	Mo(tfd-COCF ₃) ₃		Z35
			ZnChI
			Zn-ChL
			ZnO
			ZnO-c
			ZnO-mp
			ZnO-np
			ZnP
			ZnPc

ZnPcNO₂-OPh
ZnPy
Zr(acac)₄
ZrO₂-c
MAI
NiO
NiS
WO₂-np
WO₃-np

TL5

[BMIM]BF₄
3-(1-pyridinio)-1-
propanesulfonate

Al₂O₃

Al₂O₃-c

Al₂O₃-mp

Al₂O₃-np

AZO

AZO-np

B₄PyMPM

BCB

BCP

bis-C₆₀

bis-C₇₀

Bphen

C₃-CBL

C₆₀

C₆₀

C₆₀; PCBM-60

C₆₀; PhIm

C₆₀-N

C₆₀-SAM

TL6

AZO

BCP

Bi

Bphen

C₆₀

C₆₀-SAM

Ca

COTT-2

Cr

LiF

Mg

MoO₃

MoO₃

PEI

PEIE

PO-T₂T

Rhodamine

101

SnO₂-c

SnO₂-c

Spiro-MeOTAD

TaTm

TL7

LiF

MoO₃

SnO₂-c

TPBi

ZnSnO₂-c

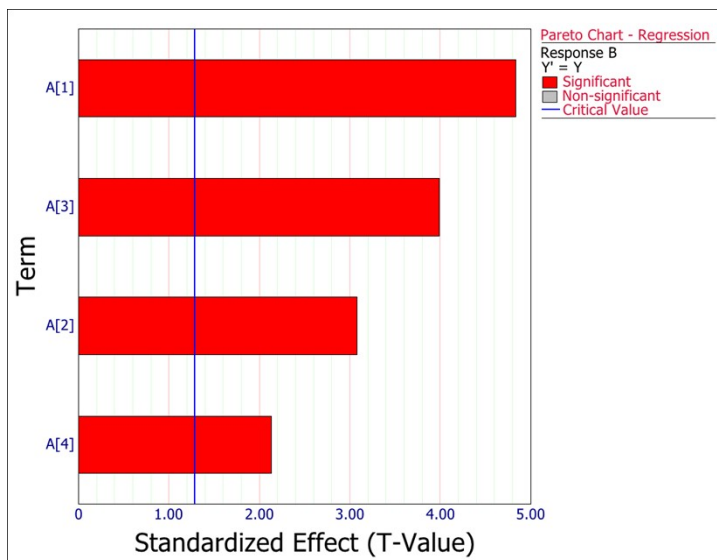
Ca	TPBi
CANP	YC-1
Carbon-nt; PEI	ZTO
Carbon-QDs	
CD	
CeOx	
CeOx-np	
Cr	
Cr2O3	
CsCO3	
Cu2O	
CuBuPc	
CuPc	
CuSCN	
DM	
DTAB	
DTPC13-ThTPA	
DTP-C6Th	
DTPC8-ThDTPA	
DTPC8-ThTPA	
EFGnPs-F	
F-60; bis-C60	
F6-TCNNQ; TaTm	
F-C60	
Fe2O3	
F-R-COOK	
FrGO	
Graphene	
Graphene oxide	
HDAC	
LiF	
Mg	
MnO3	
MnOx	
Mo	
MoO3	
MoO4	
MoOx	
MUTAB	
NiO-c	
NiO-mp	
NiO-np	
p-(F)-PO-TAZ	
P3HT	
P3HT; PMMA	
PCBC	

PCBDAN
PCBDANI
PCBM-60
PCBM-60; Graphene
PCBM-60; PMMA
PDI-Br
PDIN
PDINO
PDPP4T
PEAI
PEDOT:PSS
PEI
PEIE
PEOz
PFN
PFN; ZnO-np
PFN-Br
PFN-P2
Phen-NaDPO
PMMA
PN4N
PN6
Polyethylimine
PO-T2T
PPDIN6
PTAA
PTCDA
PTZ-1
PTZ-2
rGO
Rhodamin 101
Rhodamine 101
Rubrene
s-Bphen
SnO2
SnO2-c
SnO2-np
SnS
SP-12
Spiro-MeOTAD
SWCNTs
SWCNTs
Ta:Wox-np
TaTm
TBAI
Ti
TiO2
TiO2 -np

TiO2-c
 TiO2-np
 TIPD
 TIPD; ZnO-np
 TmPyPB
 TS-CuPc
 V2O5
 WO3
 WOx
 ZnMgO
 ZnO
 ZnO-c
 ZnO-np
 ZnSe
 Zr(acac)4
 ZrO2
 ZSO-np
 level=0.15

SI-2 Statistical tests on Figure 2

Shown below is the T-tests undertaken for data in figure 2(a) showing the PCE values achieved from reverse bias. All values of architecture are statistically significant at risk



Shown below is the T-tests undertaken for data in figure 2(a) showing the T80 values achieved from reverse bias. Only the nip-carbon architecture is statistically significant at risk level=0.15

