Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry.

Supporting Information for:

Recent Advancements in the Development of Molecular Organic Photocatalysts

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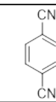
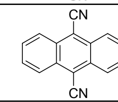
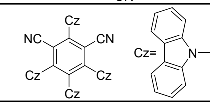
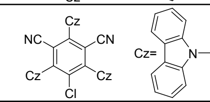
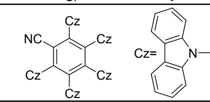
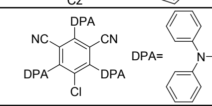
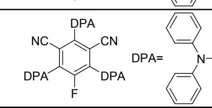
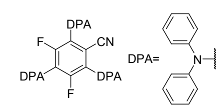
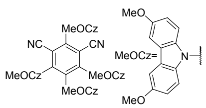
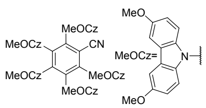
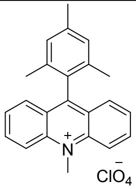
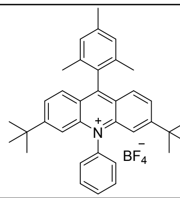
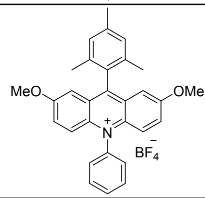
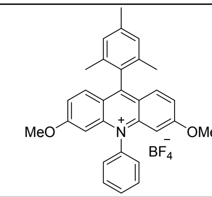
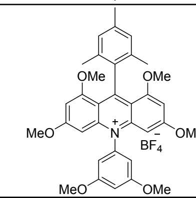
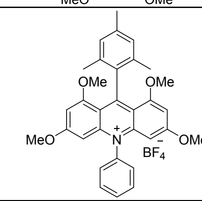
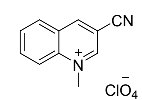
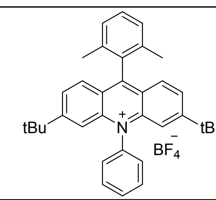
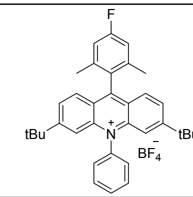
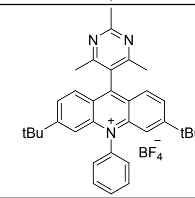
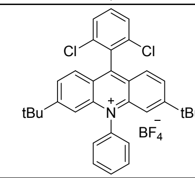
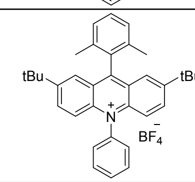
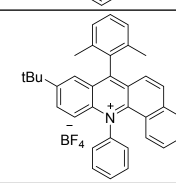
Table S1. Available Photophysical and Electrochemical Data for Reviewed PCs.

Photocatalyst (solvent)[ref]	$\lambda_{max,abs}$ **(ε (10^4 M⁻cm⁻))**	τ_0 **(ns)**	**$*E_{red1/2}$ (V vs SCE)**	**$*E_{ox1/2}$ (V vs SCE)**	**$E_{red1/2}$ (V vs SCE)**	**$E_{ox1/2}$ (V vs SCE)**	E_{00}	**Structure**
Cyanoarenes								
DCB[1-3]	290	9.7	2.55		-1.46		4.01	
DCA[4-6]	422	14.9	1.99		-0.91		2.90	
4CzIPN[7-16] (MeCN)		12.7	1.43	-1.18	-1.24	1.49	2.67	
3CzClIPN[17] (MeCN)		6.9	1.56	-0.93	-1.16	1.79	2.72	
5CzBN[17] (MeCN)		16.3	1.31	-1.42	-1.52	1.41	2.83	
3DPAClIPN[17] (MeCN)		11.5	1.24	-1.34	-1.41	1.31	2.65	
3DPAFIPN[17] (MeCN)		4.2	1.09	-1.38	-1.59	1.30	2.68	
3DPA2FBN[17] (DCM)		4.2	0.92	-1.60	-1.92	1.24	2.84	

Photocatalyst (solvent)[ref]	**$\lambda_{max,abs}$ (ε (10^4 M^-cm^-))**	**τ_0 (ns)**	***$E_{red1/2}$ (V vs SCE)**	***$E_{ox1/2}$ (V vs SCE)**	**$E_{red1/2}$ (V vs SCE)**	**$E_{ox1/2}$ (V vs SCE)**	**E_{00}**	**Structure**
4MeOCzIPN[17] (MeCN/DCM 5:1)			1.27	-1.50	-1.34	1.11	2.61	
5MeOCzBN[17] (MeCN)			1.15	-1.79	-1.66	1.02	2.81	
Acridinium								
ACR2[18] Acr+-Mes (MeCN)	430	6.4	2.06		-0.57		2.63	
ACR3[18] (MeCN)	420	14.4	2.08		-0.59		2.67	
ACR4[18] (MeCN)	466	18.7	1.90		-0.57		2.47	

Photocatalyst (solvent)[ref]	**$\lambda_{max,abs}$ (ε (10^4 $M^{-}cm^{-}$))**	**τ_0 (ns)**	**$^*E_{red1/2}$ (V vs SCE)**	**$^*E_{ox1/2}$ (V vs SCE)**	**$E_{red1/2}$ (V vs SCE)**	**$E_{ox1/2}$ (V vs SCE)**	**E_{00}**	**Structure**
ACR5[18] (MeCN)	407	3.0	2.01		-0.71		2.72	
ACR6[18] (MeCN)	414	1.3	1.65		-0.82		2.47	
ACR7[18] (MeCN)	412	1.3	1.62		-0.84		2.46	
ACR8[19, 20] 3-cyano-1-methylquinolinium perchlorate			2.72					
ACR9[21] (MeCN)	419	16.4	2.11		-0.56		2.67	

Photocatalyst (solvent)^{ref}	$\lambda_{max,abs}$ **(ε (10^4 $M^{-}cm^{-}$))**	τ_0 **(ns)**	$*E_{red1/2}$ **(V vs SCE)**	$*E_{ox1/2}$ **(V vs SCE)**	$E_{red1/2}$ **(V vs SCE)**	$E_{ox1/2}$ **(V vs SCE)**	E_{00}	**Structure**
ACR10[21] (MeCN)	421	16.8	2.13		-0.54		2.67	
ACR11[21] (MeCN)	427	16.1	2.16		-0.47		2.63	
ACR12[21] (MeCN)	425	17.1	2.21		-0.43		2.64	
ACR13[21] (MeCN)	431	19.0	2.09		-0.53		2.62	
ACR14[21] (MeCN)	460	0.3	2.07		-0.53		2.60	

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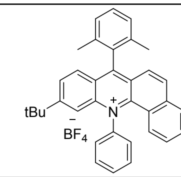
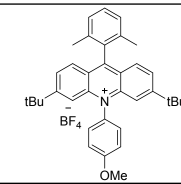
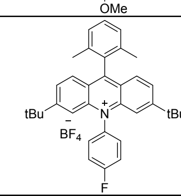
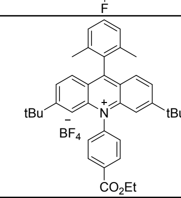
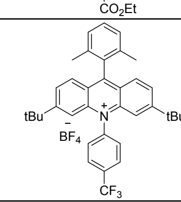
ACR15[21] (MeCN)	462	0.3	2.06		-0.54		2.60	
ACR16[21] (MeCN)	422	1.1	2.05		-0.58		2.63	
ACR17[21] (MeCN)	419	17.6	2.11		-0.55		2.66	
ACR18[21] (MeCN)	421	18.4	2.12		-0.54		2.66	
ACR19[21] (MeCN)	421	20.7	2.14		-0.51		2.65	

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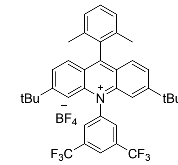
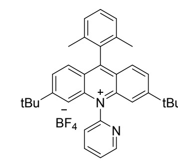
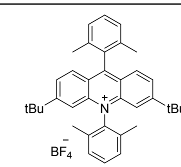
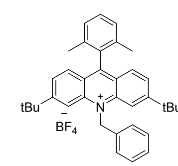
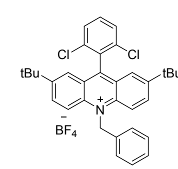
ACR20[21] (MeCN)	425	20.8	2.19		-0.45		2.64	
ACR21[21] (MeCN)	419	2.7	2.17		-0.50		2.67	
ACR22[21] (MeCN)	421	22.8	2.14		-0.53		2.67	
ACR23[21] (MeCN)	422	23.7	2.13		-0.54		2.67	
ACR24[21] (MeCN)		25.7	2.20		-0.39		2.59	

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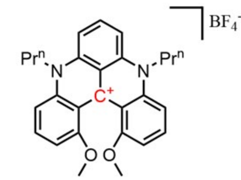
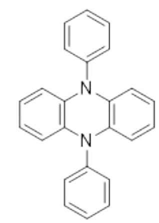
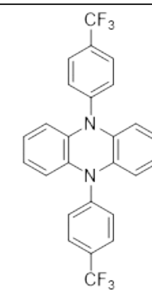
N,N′-di-n-propyl-1,13-dimethoxyquinacridinium (nPr-DMQA+) tetrafluoroborate[22] (MeCN)	616	5.5	1.15	-0.61	-0.78	1.32	1.93	
Phenazines								
AZ1 N,N'-diphenyl-5,10-dihydrophenazine[23, 24] (DMA)	369 (0.61)	3	-2.34 (determined by DFT)					
AZ2 5,10-di(4-trifluoromethylphenyl)-5,10-dihydrophenazine[23, 25] (DMAc)	367 (0.52)	1-3	-2.24 (calculate in different solvent) -1.74 in DMAc			0.28	2.02	

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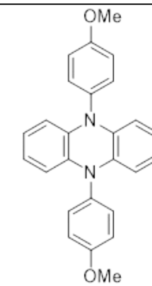
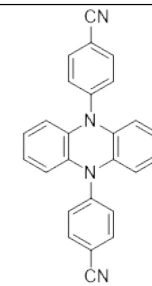
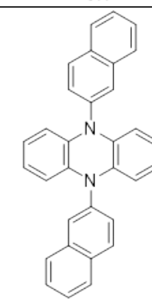
AZ3 5,10-dihydro-5,10-bis(4-methoxyphenyl)-phenazine[24]			-2.36 (determined by DFT)					
AZ4 4,4'-(5,10-phenazinediyl)bis-benzonitrile[24]			-2.06 (determined by DFT)					
AZ5 5,10-dihydro-5,10-di-2-naphthalenyl-phenazine[26, 27] (DMA)	343 (0.60)	4.3 μs	-2.20 (determined by DFT)			0.21	1.90	

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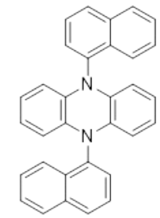
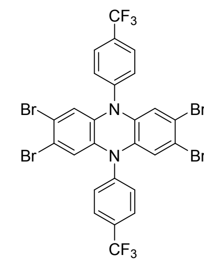
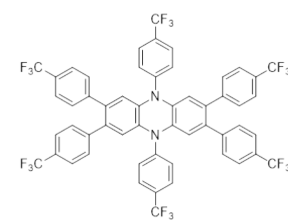
AZ6 5,10-dihydro-5,10-di-1-naphthalenyl-phenazine[26] (DMA)	362 (0.50)		-2.12 (determined by DFT)					
AZ7 2,3,7,8-tetrabromo-5,10-di(4-trifluoromethylphenyl)-5,10-dihydrophenazine[25] (DMAc)	385 (1.08)					0.60		
AZ8 2,3,5,7,8,10-hexakis(4-(trifluoromethyl)phenyl)-5,10-dihydrophena	385 (1.44)		-1.68			0.45	2.13	

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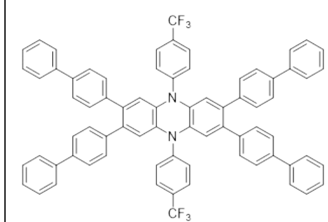
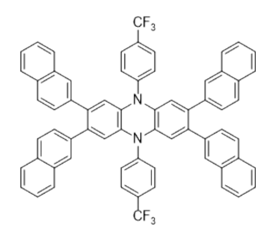
zine[25] (DMAc)								
AZ9 2,3,7,8-tetra([1,1'-biphenyl]-4-yl)-5,10-bis(4-(trifluoromethyl)phenyl)-5,10-dihydrophenazine[25] (DMAc)	389 (2.22)		-1.86			0.34	2.20	
AZ10 2,3,7,8-tetra(naphthalen-2-yl)-5,10-bis(4-(trifluoromethyl)phenyl)-5,10-dihydrophena	388 (2.00)		-1.84			0.38	2.22	

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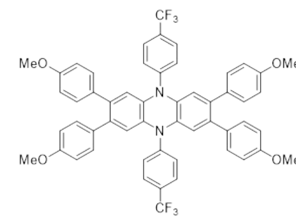
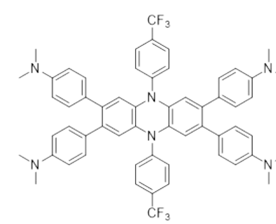
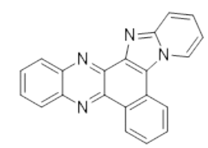
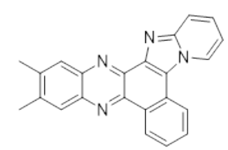
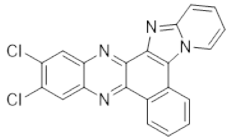
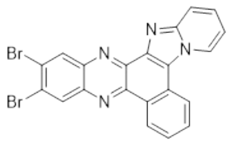
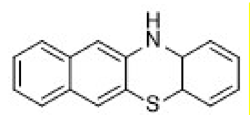
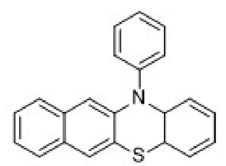
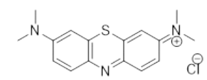
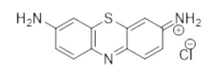
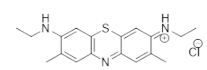
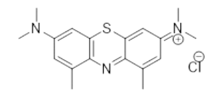
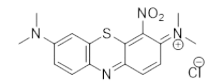
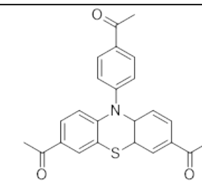
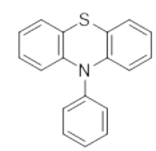
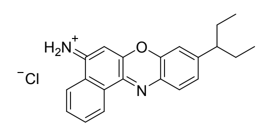
zine[25] (DMAc)								
AZ11 2,3,7,8-tetrakis(4-methoxyphenyl)-5,10-bis(4-(trifluoromethyl)phenyl)-5,10-dihydrophenazine[25] (DMAc)	388 (1.14)		-1.81			0.27	2.08	
AZ12 4,4',4'',4'''-tetrakis(N,N-dimethylaniline)-(5,10-bis(4-(trifluoromethyl)phenyl)-5,10-	392 (1.46)		-1.88			0.15	2.03	

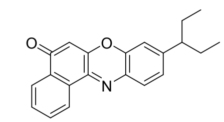
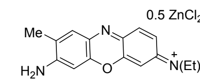
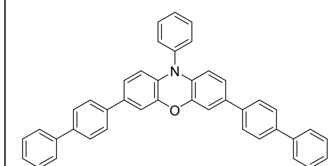
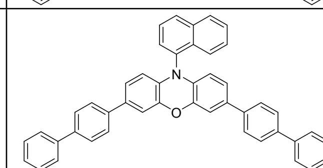
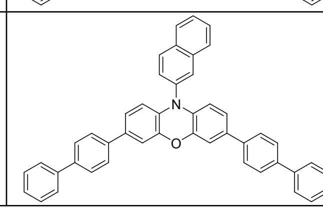
Photocatalyst (solvent)[ref]	$\lambda_{max,abs}$ (ε (10^4 $M^{-}cm^{-}$))	τ_0 (ns)	*$E_{red1/2}$ (V vs SCE)	*$E_{ox1/2}$ (V vs SCE)	$E_{red1/2}$ (V vs SCE)	$E_{ox1/2}$ (V vs SCE)	E_{00}	Structure
dihydrophenazine[25] (DMAc)								
AZ13 Benzo[*a*] pyrido[2',1':2, 3]imidazo[4, 5-*c*] phenazine[28, 29] ($CHCl_3$)	443 (0.98)	3.8	-2.17	1.70	-1.45	0.98	3.15	
AZ14 2,3-dimethyl-benzo[*a*] pyrido[2',1':2, 3]imidazo[4, 5-*c*] phenazine[28, 29] ($CHCl_3$)	443 (1.11)	3.0	-1.63	1.15	-1.47	0.99	2.62	

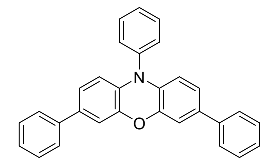
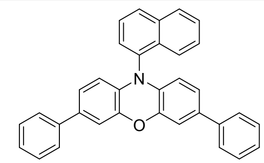
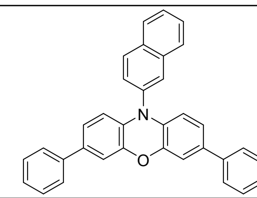
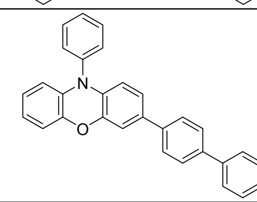
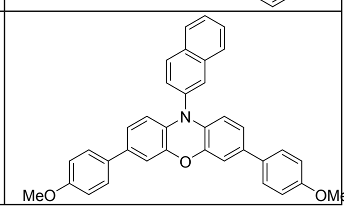
Photocatalyst (solvent)[ref]	**$\lambda_{max,abs}$ (ε (10^4 M^-cm^-))**	**τ_0 (ns)**	**$^*E_{red1/2}$ (V vs SCE)**	**$^*E_{ox1/2}$ (V vs SCE)**	**$E_{red1/2}$ (V vs SCE)**	**$E_{ox1/2}$ (V vs SCE)**	**E_{00}**	**Structure**
AZ15 2,3-dichloro-benzo[*a*] pyrido[2',1':2, 3]imidazo[4, 5-*c*] phenazine[28, 29] ($CHCl_3$)	460 (1.07)	4.5	-1.61	1.29	-1.37	1.05	2.66	
AZ16 2,3-dibromo-benzo[*a*] pyrido[2',1':2, 3]imidazo[4, 5-*c*] phenazine[28, 29] ($CHCl_3$)	462 (0.83)	1.2	1.15	-1.40	-1.35	1.10	2.50	
PHEN1[30] (MeCN)	371			2.73		0.49	-2.24	
PHEN2[30] (MeCN)	376			2.81		0.74	-2.08	

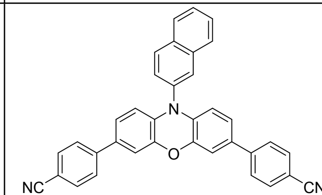
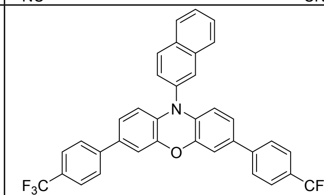
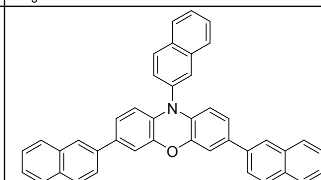
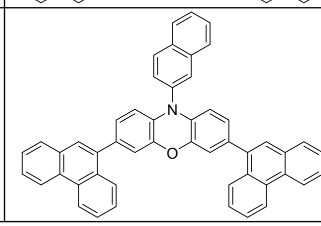
Photocatalyst (solvent)[ref]	$\lambda_{max,abs}$ (ε (10^4 $M^{-}cm^{-}$))	τ_0 (ns)	$*E_{red1/2}$ (V vs SCE)	$*E_{ox1/2}$ (V vs SCE)	$E_{red1/2}$ (V vs SCE)	$E_{ox1/2}$ (V vs SCE)	E_{00}	Structure
PHEN3[30] (MeCN)	420			2.40		0.80	-1.60	
PHEN4[30] (MeCN)	412			2.43		1.03	-1.39	
PHEN5[30] (MeCN)	414			2.57		0.26	-2.31	
PHEN6[30] (MeCN)	412			2.58		0.57	-2.02	
PHEN7[30] (MeCN)	408			2.57		0.68	-1.89	

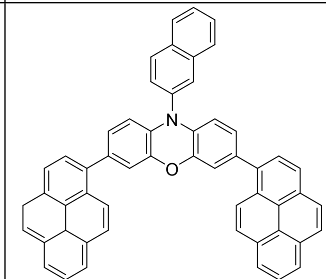
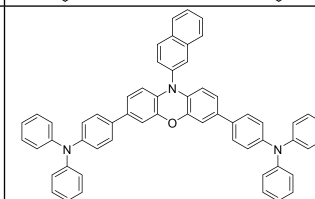
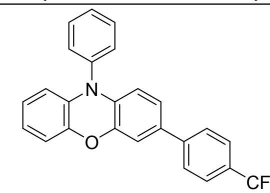
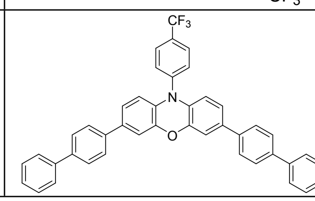
Photocatalyst (solvent)^{ref}	**$\lambda_{max,abs}$ (ε (10^4 $M^{-}cm^{-}$))**	**τ_0 (ns)**	**$^*E_{red1/2}$ (V vs SCE)**	**$^*E_{ox1/2}$ (V vs SCE)**	**$E_{red1/2}$ (V vs SCE)**	**$E_{ox1/2}$ (V vs SCE)**	**E_{00}**	**Structure**
PHEN8[30] (MeCN)	410			2.56		0.65	-1.91	
PHEN9[30] (MeCN)	408			2.55		0.76	-1.79	
Thiazines								
Methylene Blue[31-34] (MeCN)	664 (9.00)	32 µs	0.97		-0.47		1.50	
Thionin[31, 34-36] (MeCN)	598 (5.80)	20 µs	1.35		-0.34		1.69	
New Methylene Blue N[34] (MeCN)	622 (1.80)	11 µs	1.34		-0.39		1.73	

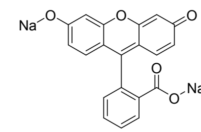
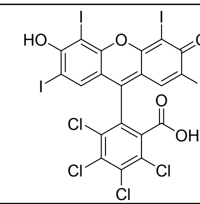
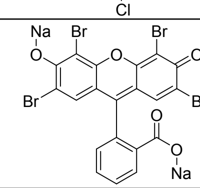
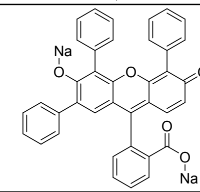
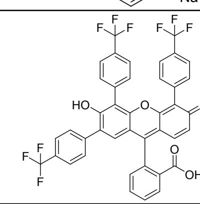
Photocatalyst (solvent)[ref]	**$\lambda_{max,abs}$ (ε (10^4 M^-cm^-))**	**τ_0 (ns)**	***$E_{red1/2}$ (V vs SCE)**	***$E_{ox1/2}$ (V vs SCE)**	**$E_{red1/2}$ (V vs SCE)**	**$E_{ox1/2}$ (V vs SCE)**	**E_{00}**	**Structure**
1,9-dimethyl Methylene Blue[34] (MeCN)	652 (8.50)	12 µs	1.03		-0.47		1.50	
Methylene Green[34] (MeCN)	654 (6.00)	14 µs	1.28		-0.22		1.50	
Tris-acetyl-PTH[37] (MeCN)	Visible light		-1.50					
PTH (10H-Phenothiazine)[38] (MeCN)			-2.10			0.68		
				Oxazines				
Nile Blue[34, 39-42] (MeCN)	630	1.76	0.87		-1.05		1.92	

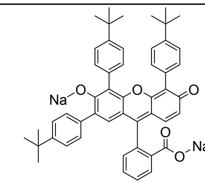
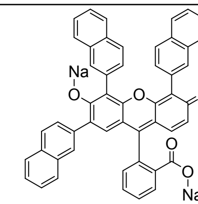
Photocatalyst (solvent)^{ref}	**$\lambda_{max,abs}$ (ε (10^4 $M^{-}cm^{-}$))**	**τ_0 (ns)**	**$^*E_{red1/2}$ (V vs SCE)**	**$^*E_{ox1/2}$ (V vs SCE)**	**$E_{red1/2}$ (V vs SCE)**	**$E_{ox1/2}$ (V vs SCE)**	**E_{00}**	**Structure**
Nile Red[43-45] (MeCN)[46]	543	4.56			-1.02			
Brilliant Cresyl Blue ALD[34] (MeCN)	616 (4.50)	0.51	1.67		-0.31		1.98	
OX1[47] (DMAc)	389 (2.40)		-1.72			0.42	2.14	
OX2[27] (DMA)	388 (2.66)	480± 50 μs	-1.80			0.65	2.45	
OX3[47] (DMAc)	384 (2.59)		-1.70			0.43	2.13	

Photocatalyst (solvent)[ref]	**$\lambda_{max,abs}$ (ε (10^4 $M^{-}cm^{-}$))**	**τ_0 (ns)**	**$^*E_{red1/2}$ (V vs SCE)**	**$^*E_{ox1/2}$ (V vs SCE)**	**$E_{red1/2}$ (V vs SCE)**	**$E_{ox1/2}$ (V vs SCE)**	**E_{00}**	**Structure**
OX4[48] (DMAc)		3.24			-2.70	0.63	3.03	
OX5[48] (DMAc)	371 (1.50)	6.32			-2.35	0.66	2.79	
OX6[48] (DMAc)	367 (1.83)	8.03			-2.40	0.64	2.86	
OX7[47] (DMAc)	362 (1.03)		-1.71			0.53	2.24	
OX8[47] (DMAc)	363 (2.20)		-1.91			0.37	2.28	

Photocatalyst (solvent)[ref]	$\lambda_{max,abs}$ (ε (10^4 M^-cm^-))	τ_0 (ns)	$^*E_{red1/2}$ (V vs SCE)	$^*E_{ox1/2}$ (V vs SCE)	$E_{red1/2}$ (V vs SCE)	$E_{ox1/2}$ (V vs SCE)	E_{00}	Structure
OX9[47] (DMAc)	411 (2.23)		-1.42			0.62	2.04	
OX10[47] (DMAc)	388 (2.11)		-1.58			0.58	2.16	
OX11[47] (DMAc)	384 (2.53)		-1.69			0.40	2.09	
OX12[47] (DMAc)	355 (1.91)		-1.72			0.46	2.18	

Photocatalyst (solvent)[ref]	**$\lambda_{max,abs}$ (ε (10^4 $M^{-}cm^{-}$))**	**τ_0 (ns)**	**$^*E_{red1/2}$ (V vs SCE)**	**$^*E_{ox1/2}$ (V vs SCE)**	**$E_{red1/2}$ (V vs SCE)**	**$E_{ox1/2}$ (V vs SCE)**	**E_{00}**	**Structure**
OX13[47] (DMAc)	379 (2.06)		-1.85			0.45	2.30	
OX14[47] (DMAc)	382 (3.77)		-1.88			0.30	2.18	
OX15[47] (DMAc)	369 (1.08)		-1.60			0.54	2.14	
OX16[49] (MeCN)	383 (2.70)			-1.98		0.72	2.86	
Xanthene								

Photocatalyst (solvent)[ref]	$\lambda_{max,abs}$ (ε (10^4 $M^{-}cm^{-}$))	τ_0 (ns)	$^*E_{red1/2}$ (V vs SCE)	$^*E_{ox1/2}$ (V vs SCE)	$E_{red1/2}$ (V vs SCE)	$E_{ox1/2}$ (V vs SCE)	E_{00}	Structure
Fluorescein[50-52] (MeOH)	491 (H_2O)	4.73			-1.22	0.83		
Rose Bengal[50, 53] (MeOH)	549	0.50	1.18	-1.33	-0.99	0.84	2.17	
Eosin Y (MeCN)	528 (7.78)	4.1	1.30	-1.53	-1.00	0.77	2.30	
E-ph$_3$ (MeCN)	550 (4.16)	3.4	1.10	-1.82	-1.11	0.39	2.21	
E-trifluoromethylph$_3$ (MeCN)	553 (4.98)		1.20	-1.65	-0.99	0.54	2.19	

Photocatalyst (solvent)[ref]	$\boldsymbol{\lambda_{max,abs}}$ **($\boldsymbol{\varepsilon}$ ($\boldsymbol{10^4}$ $\boldsymbol{M^{-}cm^{-}}$))**	$\boldsymbol{\tau_0}$ **(ns)**	**$*E_{red1/2}$ (V vs SCE)**	**$*E_{ox1/2}$ (V vs SCE)**	**$E_{red1/2}$ (V vs SCE)**	**$E_{ox1/2}$ (V vs SCE)**	**E_{00}**	**Structure**
E-tertbutylph$_3$ (MeCN)	559 (6.01)	2.7	1.14	-1.89	-1.06	0.31	2.20	
E-naph$_3$ (MeCN)	564 4.88)	3.2	1.12	-1.72	-1.08	0.48	2.20	

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