SUPPLEMENTARY TABLE

Table S1 Classification, mechanism, application of various turn-on trivalent (Al^{3+}, Cr^{3+}, Fe^{3+}) sensors.

Sl. No.	Moiety	Al^{3+} sensing		Cr^{3+} sensing		Fe^{3+} sensing			Solvent	LOD (Al^{3+}; Cr^{3+}; Fe^{3+})	No. Steps for synthesis	Mechanism	Application	Ref
		Chromogenic $\lambda_{abs(L)}$ nm; $\lambda_{abs(L+F)}$ nm	**Fluorogenic** λ_{ex} nm; $\lambda_{em(L)}$ nm; $\lambda_{em(L+F)}$ nm	**Chromogenic** $\lambda_{abs(L)}$ nm; $\lambda_{abs(L+F)}$ nm	**Fluorogenic** λ_{ex} nm; $\lambda_{em(L)}$ nm; $\lambda_{em(L+F)}$ nm	**Chromogenic** $\lambda_{abs(L)}$ nm; $\lambda_{abs(L+F)}$ nm	**Fluorogenic** λ_{ex} nm; $\lambda_{em(L)}$ nm; $\lambda_{em(L+F)}$ nm	$\boldsymbol{\Phi}$ (Al^{3+}; Cr^{3+}; Fe^{3+})						
1.	Anthracene moiety 10-(2-(((pyridin-2-yl)methylamino)methyl)phenol)methyl-anthracene	332, 348, 366, 386; 337, 358, 371, 391	364; 411; 421	332, 348, 366, 386; 337, 358, 371, 391	364; 411; 421	332, 348, 366, 386; 337, 358, 371, 391	364; 411; 421	Very low	MeOH	2.4; 1.6; 0.6 µM	2	PET	-	12
2.	Anthracene moiety 2-(Benzothiazol-2-yl)-4-bromo-3-((anthracen-9-ylmethylene)aminopropoxy)benzene	-	-	369, 383; 442	380; 428; 576	369, 383; 369, 442	380; 428; 576	-; 33 times; 24 times	MeCN	-; 0.46 µM; 0.45 µM	4	PET	-	13
3.	Anthracene moiety Cu complex of anthracene based valine derivative	-	365; fluores-cence increment	-	365; fluores-cence increment	-	365; fluores-cence increment	-	MeOH/ H_2O (8:2, v/v)	-	-	PET inhibition	-	14
4.	Naphthalimide moiety	409; 392	530;530 (41 fold Increment)	409; 394	530; 530 (30 fold increment)	409; 381	530; 530 (50 fold increment)	0.016 0.67 0.47 0.80	9:1, v/v, H_2O: CH_3CN	3.6×10^{-7}M; 3.8×10^{-7}M; 3.5×10^{-7}M	2	PET inhibition	Bio-imaging of HaCaT cells	15
5.	Pyrene moiety 2-((pyren-1-ylmethylene)amino)ethanol	355; 435	395; 417; 500	355; 435	395; 417; 500	355; 435	395; 417; 500	168; 180; 208 fold	CH_3CN	10^{-7} M	1	AIEEE	Raw 264.7 cells	16
6.	Pyrene moiety (N_1E,N_3E)-N_1,N_3-bis(pyren-1-ylmethylene) isophthalohydrazide	379; 367	379; 443; 527	379, 369	379; 443; 527	379; 375	379; 443; 527		DMSO: HEPES (8:2 in	2.88; 1.89; 3.00 µM	1	Excimer formation	HeLa cells	17

								vol.).					
7.	Quinoline moiety	296; 315	296; 406; 413	296; 315	296; 406; 413	296; 315	296; 406; 413	0.05; 0.29; 0.35; 0.26	100% Aqueous medium	2.10 μM; 4.16 μM; 2.09 μM,	2	chelation	Bio -imaging in HeLa cells	18
8.	Quinoline moiety spirobenzopyran-quinoline (SBPQ)	306, 362; 362, 440	460; 552; 675 (88 fold Increment)	306, 362; 362, 440	460; 552; 675 (34 fold Increment)	306, 362; 362, 440	460; 552; 675 (40 fold Increment)	0.01; 0.42; 0.18; 0.25	CH_3CN–HEPES buffer solution (1/1, v/v, pH = 7.4)	3.24×10^{-8} M		ICT	Candida albicans cells, Tecoma stans pollen grains	19
9.	Rhodamine moiety naphthopyran-rhodamine 6G dyad	471; 450-580	516; non fluorescent ; 556	471; 450-580	516; non fluorescent ; 556	471; 450-580	516; non fluorescent ; 556	-; 0.08; 0.33; 0.37	CH_3OH	5.61×10^{-7}M	2		Test paper	20
10.	Rhodamine moiety BODIPY-rhodamine	374, 499; 559	374, 499; 559 (13 fold increment)	374, 499; 559	374, 499; 559 (12 fold increment)	374, 499; 559	374, 499; 559 (9 fold increment)	I_{585}/I_{517} was increased by 13, 12, 9 fold	1:1 CH_3CN/ 0.01M Tris HCl buffer	-	7	bond energy transfer (TBET)	W138 (normal lung fibroblastcells)	21
11.	Rhodamine moiety	-; 555	530; non fluorescent ; 588	-; 555	530; non fluorescent ; 588	-; 555	530; non fluorescent ; 588		CH_3OH/ H_2O (8:2, v/v,	3.0×10^{-3}; 3.0×10^{-3}; 2.9×10^{-3}	3		-	22
12.	Rhodamine moiety N-(Rhodamine-B)lactam-ethylenediamine,[20-(2-aminoethyl)- 3,6-bis(diethylamino)-10H-spiro[anthracene-9,10-isoindolin]-30- one	330, 270; 561	495; non fluorescent ; 582	330, 270; 561	495; non fluorescent ; 582	330, 270; 561	495; non fluorescent ; 582	0.014; 0.34; 0.49; 0.24	CH_3OH/ H_2O,1:1, v/v	-	3	FRET	Test paper strip	23
13.	Rhodamine moiety 2-(2-(5-bromo-2-hydroxybenzylideneamino)ethyl)-3',6'-bis(diethylamino)spiro[isoindoline-1,9-xanthen]-3-one	No significant absorption band; 528	500; non-fluorescent ; 552	No significant absorption band; 528	500; non-fluorescent ; 552	No significant absorption band; 528	500; non-fluorescent ; 552	0.008; 0.75; 0.36; 0.26	CH_3OH/ H_2O (7:3, v/v) (pH 7.2)	1.18; 1.80 and 4.04 nM	2	Spiro -lactam ring opening	3 and 5 input advanced level logic gates, molecular keypad lock and memory device	24

14.	Rhodamine moiety	240, 274, 317; 560	350, 500; non-fluorescent ; 583	240, 274, 317; 560	350, 500; non-fluorescent ; 583	240, 274, 317; 560	350, 500; non-fluorescent ; 583	0.05; 0.28; 0.22; 0.71	C_2H_5OH/ H_2O (1:1, v/v)	1.17 μM; 3.16 μM; 2.50 μM	2	Spiro -lactam ring opening	-	25
15.	Rhodamine moiety Rhodamine p-chlorobenzaldehyde	No significant absorption band; 550	-; non-fluorescent ; fluorescence between 560-590 nm	No significant absorption band; 550	-; non-fluorescent ; fluorescence between 560-590 nm	No significant absorption band; 550	-; non-fluorescent ; fluorescence between 560-590 nm	-	Tris–HCl buffer solution (pH 7.4)	-; 8.64 μM; 10.5 μM	2	-	-	26
16.	Rhodamine moiety Rhodamine–naphthalimide dyad probe	400, 540-580; 562 (18 fold increment)	400; 532; 583	400, 540-580; 562 (20 fold increment)	400; 532; 583	400, 540-580; 562 (126 fold increment)	400; 532; 583	-	1:1 v/v 0.01MTris HCl–CH_3CN, pH 7.4.	-	7	FRET	Bio -imaging in W138 cells	27
17.	Rhodamine moiety	360; 556	360; 566; 586	360; 556	360; 566; 586	-	-	0.0018; -; 0.0524;	MeOH/ H_2O (4:1, v/v)	3.6×10^{-8} M; 7.5×10^{-8} M; -	4	Spiro -lactam ring opening	Bio -imaging in A549 cells	28
18.	Vaniline derivatives	-	278; non fluorescent ; 400-500 fluorescence increment	-	278; non fluorescent ; 1500 fluorescence increment	-	278; non fluorescent ; 2500 fluorescence increment	0.21	-	-		-	-	29