

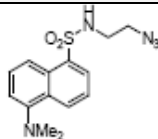
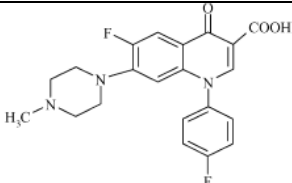
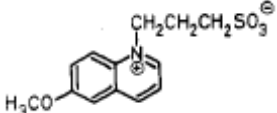
Fluorescent Labels, Probes, and Sensor Molecules

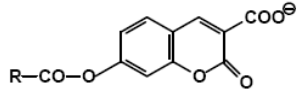
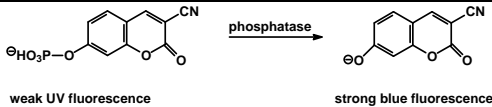
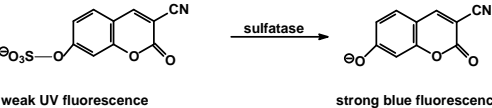
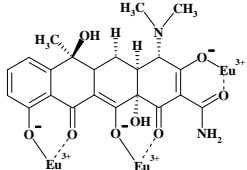
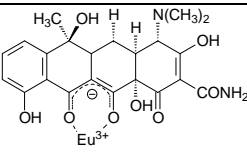
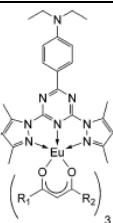
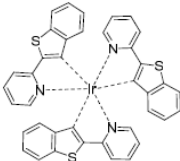
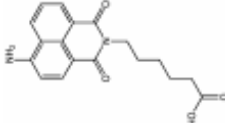
Developed at Regensburg University

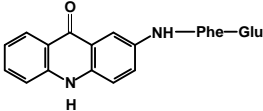
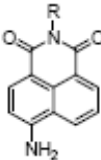
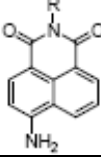
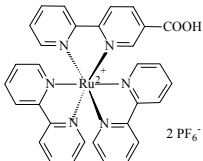
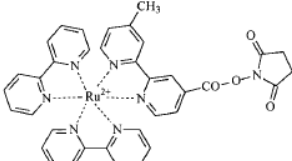
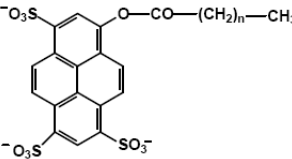
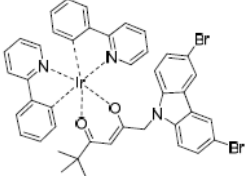
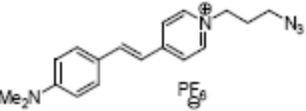
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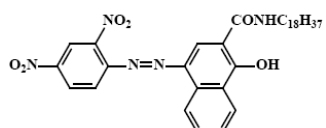
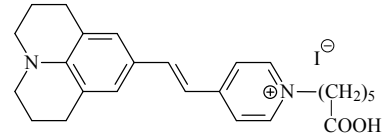
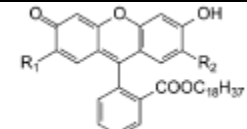
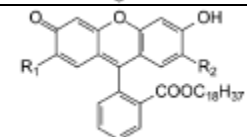
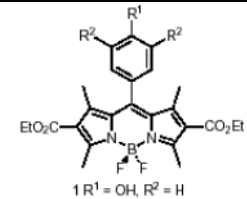
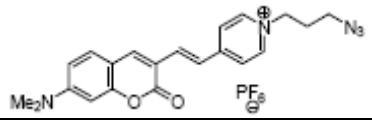
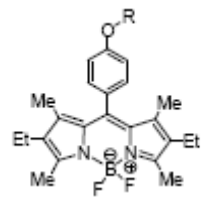
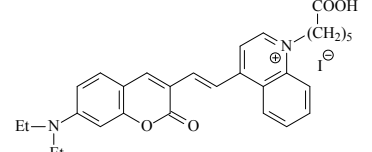
- (1) The dyes are listed according to their longest-wave absorption maximum.
- (2) The *Short Code* (also giving the absorption maximum) may be used when referring to this list.
- (3) The *Extended Code* indicates chemical reactivity or function; see below.
- (4) The column on absorption and emission maxima gives the longwave absorption peak (A); log ϵ values (in brackets), emission maxima (E); quantum yields (QY) and lifetimes (τ) where available. Spectra are for watery solutions unless otherwise specified.

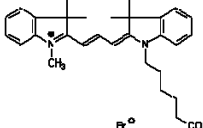
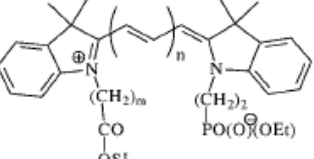
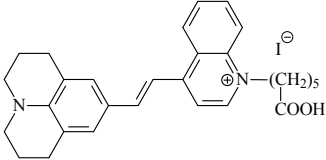
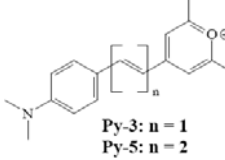
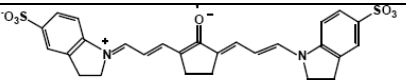
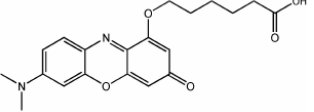
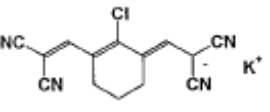
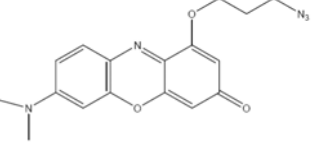
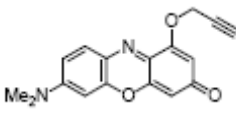
Extended Codes	
-ALB: probe for albumin	-NHS: N-hydroxy-succinimide ester of COOH group; amine-reactive
-BTN: label containing a biotin unit	-NNN: label containing an azido group; for use in click reactions
-CCH: label containing a terminal alkyne group; for use in click reactions;	-OXY: probe for mol. oxygen
-CLO: label containing a reactive chloro atom (at carbon); amine-reactive;	-PHO: probe for inorganic phosphate(s) and/or biophosphates
-CRB: probe containing a carboxy group	-POL: probe for solvent polarity
-DNA: probe for DNA; biophosphates and phosphate	-PYR: label containing a pyrylium group (amine-reactive)
-HAL: probe for halides (chloride etc.)	-ROS: probe for (hydrogen) peroxide(s) and reactive oxygen species
-LIP: contains a long alkyl chain; usually a probe for membranes, micelles, etc.	-SCL: label containing a sulfochloride group; reactive to NH ₂ , SH, OH
-MAL: label containing a maleimide group (mainly thiol-reactive);	-TMP: probe for temperature
-NCS: label containing an isothiocyanate group (amine-reactive);	-000: fluorophore without reactivity; used for doping particles

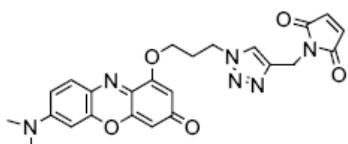
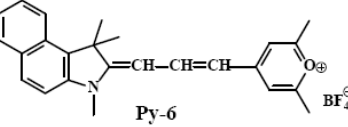
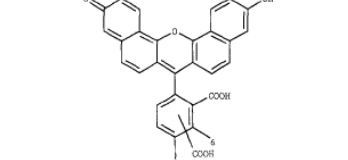
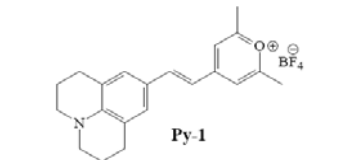
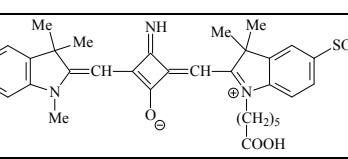
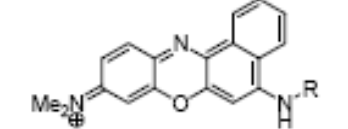
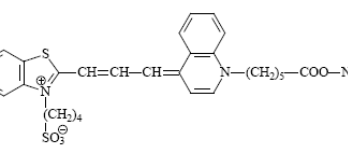
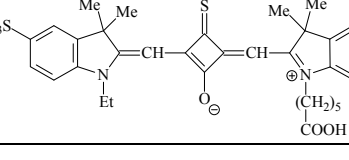
Short Code	Extd. Code	Abs. max. (log ϵ) Em. max. (QY, τ)	Remarks and References	Formula
UR-332-a	-NNN	A: 332 nm (log ϵ 3.53) (MeOH); E: 460 nm	Click reagent; strongly solvatochromic fluor.; ref.: P. Kele et al.; Org. Biomol. Chem., 2009; DOI: 10.1039/b907741c	
UR-340-t	-DNA	A: 340 nm; E: 545 nm; QY 0.001; QY increases 90-fold with DNA, τ from 33 μ s to almost 1 ms.	DNA probe (difloxacin complex with Tb ³⁺ ion); ref.: A. V. Yegorova et al.; Anal. Chim. Acta 584 (2007) 260; time-resolved assays can suppress background luminescence.	
UR-347-m	-HAL	A: 347 nm (3.8); E: 450 nm; QY 0.6; τ ca. 18 ns;	widely used quenched chloride probe; a.k.a. SPQ; ref.: O. S. Wolfbeis et al.; Fresenius Z. Anal. Chem. 314 (1983) 577; Anal. Chem. 56 (1984) 427.	

UR-378-e	-ENZ	A: 378 nm; E: 455 nm; QY 0.7 in pH 8 solution after hydrolysis to the phenol (anion)	probe for fluorimetric assay of esterases; ref. O. S. Wolfbeis et al., Anal. Biochem. 129 (1983) 365; also hydrolyzed by various albumins, O. S. Wolfbeis et al; Clin. Chim. Acta 164 (1987) 329; ; more longwave substrates also described	
UR-378-p	-ENZ	A: 378 nm; E: 455 nm; QY 0.7 in pH 8 solution after hydrolysis to the phenol anion (abs. max; the assay for acid P-ase is performed at pH 5.5	probe for photometric and fluorimetric kinetic assay of alkaline phosphatase (E. Koller et al.; Mikrochim. Acta 1985 (I), 389) and acid phosphatase (Anal. Biochem. 143 (1984) 146; ; more longwave substrates also described	 weak UV fluorescence strong blue fluorescence
UR-378-s	-ENZ	A: 378 nm; E: 455 nm; QY 0.7 in pH 8 solution after hydrolysis to the phenol	probe for photometric and fluorimetric kinetic assay of sulfatase; E. Koller et al.; Anal. Chim. Acta 170 (1985) 73	 weak UV fluorescence strong blue fluorescence
UR-401-h	-ROS	A: 401 nm (log ε 4.2); E: 616 nm; QY 0.003 in absences of H ₂ O ₂ ; but 0.04 in its presence; τ ₁ 8.7 μs; τ ₂ 30 μs; this is the Eu(III) 3:1 complex with tetracyclin.	probe for H ₂ O ₂ ; also used to determine (a) catalase and peroxidases, (b) enzymatically produced H ₂ O ₂ . Refs.: Angew. Chem. Intl. Ed. 41 (2002) 4495; Chem. Eur. J. 12 (2006) 2730; J. Fluoresc. 15 (2005) 755; Anal. Biochem. 320 (2003) 129.	
UR-401-p	-PHO	A: 402 nm (log ε 4.2); E: 616 nm; QY 0.004 in absence of phosphates; but 0.02 to 0.06 in its presence; this is the Eu-tetracyclin 1:1 complex	probe for inorganic phosphate and biophosphates; used to determine phosphatases and kinases. Refs.: A. Duerkop et al.; Anal. Chim. Acta 555 (2006) 292;	
UR-402-t	-TMP	A: 402 nm (log ε = 4.86, in toluene); E: 616 nm (τ: 0.8 ms at 0 °C, and 0.3 ms at 50 °C)	probe for temperature (range: 0 to 70 °C); ; Eu/ligand complex; Ref.: S. Borisov et al.; Anal. Chem. 78 (2006) 5094.	
UR-408-i	-OXY	A: 408 nm (log ε 4.34) (chloroform) E: 596, 645 nm (lifetime 10 μs)	probe for oxygen; Ir(btpy) ₃ ; L. H. Fischer et al.; Chemistry, 2009.	
UR-431-o UR-431-c	-CRB -NHS	A: 431 nm (log ε 3.8) E: 550 nm; QY 0.4 – 0.6;	excitable with the 375-nm and 405-nm diode lasers; M. Link et al; Microchim. Acta, 2009; the NHS ester is a label for proteins and amines	

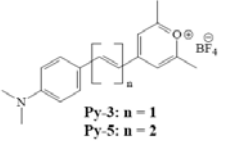
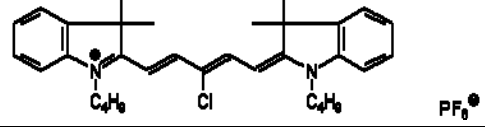
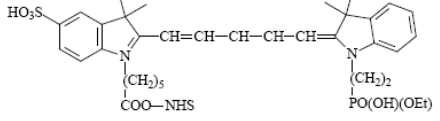
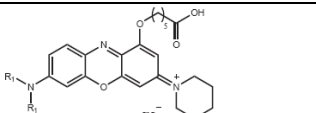
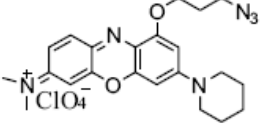
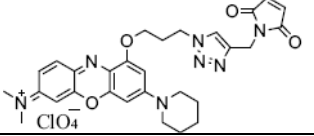
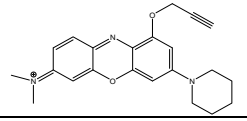
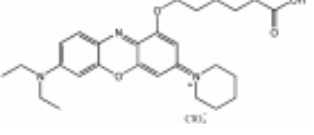
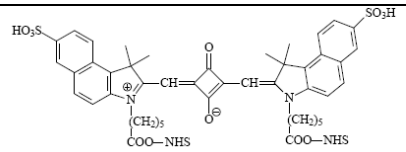
UR-450-z	-ENZ	A:450 nm (log ϵ 4.2); E: 570 nm; QY 0.65;	substrate for direct and continuous kinetic assay of chymotrypsin and trypsin; ref.: J. Baustert et al; Anal. Biochem. 171 (1988) 393; several other fluorogenic peptides also prepared	
UR-450-e	-NNN	A: 450 nm (log ϵ 3.83) E: 538 nm	click label (R = $-(\text{CH}_2)_2\text{-N}_3$); ref.: P. Kele et al.; Org. Biomol. Chem., 2009; DOI: 10.1039/ b907741c	
UR-451-o	-CCH	A: 451 nm (log ϵ 3.83) E: 539 nm	click label (R = $-(\text{CH}_2)_2\text{-C}\equiv\text{CH}$); ref.: P. Kele et al.; Org. Biomol. Chem., 2009; DOI: 10.1039/ b907741c	
UR-453-c UR-453-n	-CRB -NHS	A: 453 nm (log ϵ 4.16); E: 673 nm; QY: 0.01; τ ca. 600 ns;	Ru complex; NHS ester is a protein label; probe for lum. polarization; luminescence quenched by O ₂ ; ref.: B. Wetzl et al., J. Chrom. B 793 (2003) 83; the NHS ester is a label for proteins and amines.	
UR-455-r UR-455-a	-CRB -NHS	A: 455 nm (log ϵ 4.16); E: 670 nm; small QY;	NHS ester (see formula) is a protein label; used in an immuno FRET study along with UR-634-u; ref.: C. M. Augustin et al., Anal. Biochem. 305 (2002) 166	
UR-458-e	-ENZ	A: 458 nm (log ϵ 4.3); E: 512 nm; QY almost 1.0; lifetime 3 – 5 ns; not fluorescent if excited at 458 nm unless hydrolyzed by enzyme	fluorogenic substrate for esterases; possesses unique water solubility, O. S. Wolfbeis et al.; Anal. Biochem. 129 (1983) 365	
UR-459-t	-TMP	A: 459 nm (log ϵ 3.45); 408 nm (log ϵ 3.58) (chloroform); E: 522 nm; τ 1.6 μ s	Optical probe for temperature; Ir(ppy) ₂ (acac); L. H. Fischer et al.; submitted; 2009.	
UR-480-a	-NNN	A: 480 nm, (log ϵ 4.67); E: 602 nm	click label; fluorescein analog but with much larger Stokes shift; pH independent fluorescence; ref.: P. Kele et al.; Org. Biomol. Chem., 2009; DOI: 10.1039/b907741c	

UR-481-k	-LIP	A: 481 nm in phenol form (at low pH) ; 640 nm in alkaline solution; no fluorescence	lipophilic pH probe; also used in sensors for ions and pH; color change from yellow to blue; H. He et al., <i>Anal. Chem.</i> 65 (1993) 123	
UR-495-m UR-495-p	-CRB -NHS	A: 495 nm (log ε 4.34) E :636 nm; QY 0.01; ; QY up to 0.41 on protein.	very large Stokes shift; B. Wetzl et al., <i>J. Chrom. B</i> 793 (2003) 83; the NHS ester is a label for proteins and amines.	
UR-496-i	-LIP	A: 496 nm (4.52); E: 532 nm. QY 0.9 at pH > 8; τ ~4.5 ns.	lipophilic pH probe; pK _a 6.8; a.k.a. McFOE; ref. B. M. Weidgans et al., <i>Analyst</i> 129 (2004) 645; probe without lipid chain also known.	
UR-502-b	-LIP	A: 502 nm (4.54); E: 536 nm (QY 0.9 at pH > 8; τ ~ 4.5 ns).	lipophilic pH probe (R ₁ = R ₂ = Cl); pK _a 5.5; a.k.a. McFOE; ref. B. M. Weidgans et al., <i>Analyst</i> 129 (2004) 645; probe without lipid chain also known.	
UR-504-u	-pH	A: 504 nm (chloroform); E: 522 nm; QY ~0.2 in phenol form.	PET type of pH probe for non-aqueous systems; pseudo pK _a ~10.2 if contained in polymer matrix; ref.: T. Gareis et al., <i>Chem. Comm.</i> 1997 , 1717	
UR-505-a	-CCH	A: 505 nm (log ε 4.65) E: 630 nm	click label; ref.: P. Kele et al.; <i>Org. Biomol. Chem.</i> , 2009; DOI: 10.1039/b907741c	
UR-516-e UR-516-y	-NNN -CCH	A: 520 nm (log ε 4.80); E: 535 nm	click label; R = -(CH ₂) ₂ -N ₃ ; ref.: P. Kele et al.; <i>Org. Biomol. Chem.</i> , 2009; DOI: 10.1039/b907741c; the alkyne (R = -(CH ₂)-C≡CH) has the same spectral properties.	
UR-522-h UR-522-n	-CRB -NHS	A: 522 nm (log ε 4.45) E: 701 nm; QY 0.01	very large Stokes shift; B. Wetzl et al., <i>J. Chrom. B</i> 793 (2003) 83; the NHS ester is a label for proteins and amines	

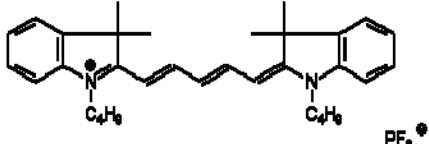
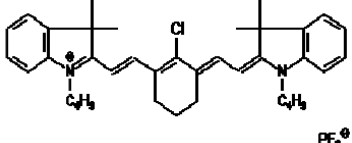
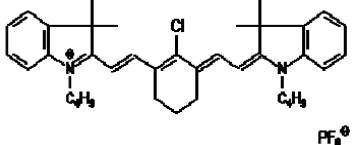
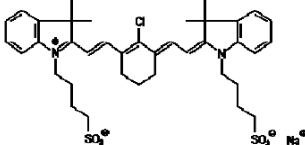
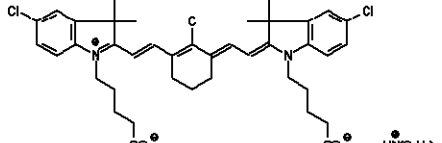
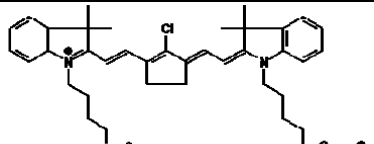
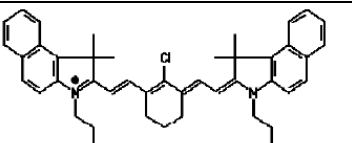
UR-543-c UR-543-o	-CRB -NHS	A: 543 nm; E: 560 nm; QY: 0.04 in MeOH but lower in water; log ϵ 4.56	moderately bright fluorophore; a.k.a. FEW's S-0771; the NHS ester is a cyanine label for amines and proteins; moderately soluble in water;	
UR-546-k UR-546-n	-CRB -NHS	A: 546 nm (log ϵ 4.92); E: 562 nm; QY 0.04 to 0.1, but 0.1 – 0.6 if conj. to protein	the NHS ester ("-OSI") is a protein and amine label a.k.a. <i>Chromo 546</i> and as <i>FO-546</i> (Sigma); n = 1; ref.: M. Gruber et al.; J. Fluoresc. 15 (2005) 207. "OSI" (oxysuccinimide) = NHS.	
UR-568-h UR-568-g	-CRB -NHS	A: 568 nm (4.46); E: 670 nm; QY up to 0.4 if conj. to protein	the NHS ester is a label for proteins and amines with large Stokes shift; ref.: B. Wetzl et al., J. Chrom. B 793 (2003) 83	
UR-572-y	-PYR	A: 572 nm (log ϵ 4.7) <u>before</u> conj. to amine; A: 464 nm (log ϵ 4.3) <u>after</u> conj.; E: 641 nm before conj. but 582 nm after conj.	n = 1; a.k.a. Py-3; ref.: B. Wetzl et al.; Angew. Chem. Intl. Ed. 43 (2004) 5400; bluer and poor QY before conj., but red and higher QY (0.1 – 0.2) after conj.; τ >0.5 ns before conj.; 2.3 ns after conj. to amine or protein	
UR-577-b	-POL	A: 577 nm (4.88) in water, but 520 nm in PrOH; E: 644 nm in water (low QY); 596 nm in PrOH (high QY).	solvent polarity probe; use in a sensor: M. A. Kessler et al., Sensors Actuat. B3 (1991) 267.	
UR-589-c UR-589-n	-CRB -NHS	A: 589 nm (log ϵ 4.26) in water but 560 nm in MeOH; E: 630 nm; QY of protein conjugates around 0.14	ref: M.L. (ROx dye); the NHS ester is a label for proteins and amines	
UR-593-p	-ALB	A: 593 nm (log ϵ 5.12); 600 nm in presence of HSA; E: 608 nm in water, 630 nm in presence of HSA.	probe for albumins; a.k.a. Albumin Blue 580 (AB580); ref.: M. A. Kessler et al., Anal. Biochem. 248 (1997) 180; Clin. Chem.. 43 (1997) 996; more stable than other probes for the AB type.	
UR-595-a	-NNN	A: 595 nm (log ϵ 4.31) in water but 560 nm in MeOH; E (water): 629 nm; QY ~0.01 in water; 0.12 in MeOH	purple click label; ref.: diploma thesis J. Kleim, 2009 (ROx label); strongly solvatochromic (solutions in hexane are yellow)	
UR-596-o	-CCH	A: 596 nm (log ϵ 4.28) in water but 557 in MeOH; E: 631 nm (water)	click label; strongly solvatochromic (550 nm in MeOH); ref.: P. Kele et al.; Org. Biomol. Chem., 2009; DOI: 10.1039/b907741c	

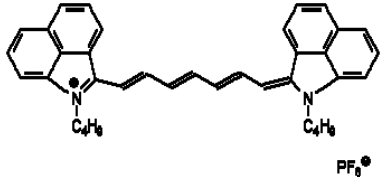
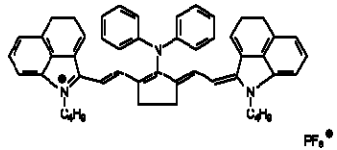
UR-597-b	-MAL	A: 597 nm (log ϵ 4.33); 557 nm in MeOH; E: 628 nm (620 in MeOH); QY 0.12 in MeOH; probably higher on protein	purple thiol label with spacer group; ref.: diploma thesis J. Kleim, 2009 (ROx label); strongly solvatochromic; possibly a probe for local protein polarity	
UR-598-y	-PYR	A: 598 nm (log ϵ 4.8) before conj. to amine; 540 nm (log ϵ 4.4) after conj.; E: 627 nm before conj.; 598 nm after conj.	a.k.a. Py-6; Ref.: D. B. Craig et al.; Electrophoresis 26 (2005) 2208; QY 0.01 before conj. to amine, but 0.4 after conj.	
UR-602-u	-pH	at pH > 8: A (exc.): 602 nm (log ϵ = 4.6); E: 670 nm; at pH < 7: A (exc.): 510 nm; (log ϵ = 4.3); E: 572 and 656 nm (2 bands)	pH probe; pKa value 7.4 to 7.6; was covalently conjugated to aminoethyl cellulose; probably also a protein label; ref.: O. S. Wolfbeis et al.; Mikrochim. Acta 108 (1992)133	
UR-621-y	-PYR	A: 621 nm (log ϵ 4.7) before conj. to amine; A: 503 nm (log ϵ 4.3) after conj.; E: 665 nm before conj.; E: 602 nm after conj.; rather poor QY before conj. but 0.3 – 0.6 after conj.; τ > 0.5 ns before conj.; 2.8 ns after conj.	a.k.a. Py-1; also used in protein assay: Anal. Biochem. 344 (2005) 122; as a protein label in CE: D. B. Craig et al.; Electrophoresis 26 (2005) 2208, and as a label in PAGE: R. Meier et al., Anal. Chem. 80 (2008) 6274	
UR-626-q UR-626-n	-CRB -NHS	A: 626 nm (5.24); E: 636 nm; QY up to 0.2 on protein	Squarylium dye; binds to HSA by electrostatic interaction.; B. Wetzl et al., J. Chrom. B 793 (2003) 83; the NHS ester is a covalent label for proteins and amines.	
UR-627-e UR-627-o	-NNN -CCH	A: 627 nm (log ϵ 4.26); E: 673 nm; QY ~ 0.2	click label; much smaller molar absorbance than other oxazine labels; UR-627e-NNN: R = -(CH ₂) ₂ -N ₃ ; UR-627-o-CCH: R = -CH ₂ -C≡CH, ref.: Xiaohua LI et al.; submitted (2009); P. Kele et al.; Org. Biomol. Chem., 2009; DOI: 10.1039/b907741c	
UR-627-u	-NHS	A: 627 nm (log ϵ 5.10); E: 650 nm; QY 0.01; much higher if conj. to HSA; τ 1.4	a.k.a. RB-627; undergoes slight longwave shift on conj.; ref.: B. Oswald et al., Photochem. Photobiol. 74 (2001) 237	
UR-628-c UR-628-n	-CRB -NHS	A: 628 nm (5.22); E: 641 nm; QY up to 0.3 on protein	Thio-squarylium dye; B. Wetzl et al., J. Chrom. B 793 (2003) 83; the NHS ester is a label for proteins and amines	

UR-631-r UR-631-w	-CRB -NHS	A: 631 nm (5.23); E: 643 nm; QY up to 0.2 on protein	Dithio-squarylium dye; B. Wetzl et al., J. Chrom. B 793 (2003) 83; the NHS ester is a label for proteins and amines	
UR-632-q UR-632-h	-CRB -NHS	A: 631 nm (5.36); E: 645 nm; QY up to 0.4 on protein	Imino squarylium dye; very large ε; ref.: B. Wetzl et al., J. Chrom. B 793 (2003) 83; the NHS ester is a label for proteins and amines	
UR-633-s	-MAL	A: 633 nm (log ε 4.17) and 597 nm (log ε 4.2); E: 653 nm; QY 0.015 before conj. to thiol;	thiol label with long spacer arm; QY increases strongly on conj. to a thiol; ref.: Xiaohua LI et al.; submitted (2009)	
UR-634-u UR-634-e	-CRB -NHS	A: 634 nm (log ε 5.21); E: 646 nm in water, but 660 nm if conj. to protein QY 0.4 – 0.5 if conj. to protein. τ ~2 ns in water.	634-e is a water soluble squarain-type of protein label; compound Sq-635-m in: B. Oswald et al.; Bioconj. Chem. 10 (1999) 925; also binds to HSA by electrostatic interaction	
UR-635-n	-NHS (bis)	A: 635 nm (log ε 5.26); E: 642 nm; QY 0.01; much higher if conj. to HSA; τ 1.7 ns	bis-reactive; a.k.a. RB-634; undergoes slight longwave shift on conj.; ref.: B. Oswald et al., Photochem. Photobiol. 74 (2001) 237; B. Oswald et al.; Anal. Biochem. 280 (2000) 272	
UR-641-c UR-641-k	-CRB -NHS	A: 641 nm (MeOH); E: 663 nm; QY: 0.23 in MeOH but lower in water; high ε;	a.k.a. FEW's S-0223; the NHS ester is a cyanine label for amines and proteins; moderately soluble in water	
UR-642-j UR-642-z	-CRB -NHS	A: 642 nm (log ε 5.26); E: 663 nm; QY up to 0.56 on protein	cyanine dye; ref.: Gruber et al.; J. Fluoresc. 15 (2005) 207; the NHS ester is a label for proteins and amines a.k.a. Chromeo 642 (Chromeon) and as FR-642 (Sigma)	
UR-643-d UR-643-k	-CRB -NHS	A: 641 nm (4.86); E: 666 nm; QY up to 0.52 on protein	Di-aryl squarylium dye; binds to HSA by electrostatic interaction.; ref.: Gruber et al.; J. Fluoresc. 15 (2005) 207; the NHS ester (643-k) is a label for proteins and amines	
UR-644-n UR-644-l	-CRB -NHS	A: 644 nm (MeOH); E: 666 nm; QY: 0.29 in MeOH but lower in water; high ε	a.k.a. FEW's S-0436; the NHS ester is a cyanine label for amines and proteins; moderately soluble in water	

UR-644-y	-PYR	A: 644 nm (log ϵ 4.7) <u>before</u> conj. to amine; A: 465 nm (log ϵ 4.3) <u>after</u> conj.; E: 732 nm before conj.; 629 nm after conj.	A.k.a. Py-5 (n = 2); B. Wetzl et al.; Angew. Chem. Intl. Ed. 43 (2004) 5400; blue-green color and poor QY before conj. but red and higher QY (0.1 – 0.2) after conj.; τ >0.5 ns before conj.; 2.3 ns after conj.	
UR-645-w	-CLO	A: 645 nm (MeOH); E: 661 nm (MeOH); QY 0.09 in MeOH but 0.50 in toluene	amino-reactive chlorocyanine dye; a.k.a. FEW S-2053; soluble in MeOH; insoluble in water; used to label nanoparticles carrying amino groups	
UR-646-x	-NHS	A: 646 nm (log ϵ 5.26); E: 666 nm; QY 0.2; higher if conj. to HSA; τ 1.6 ns.	a.k.a. RB-646; undergoes slight longwave shift on conj.; ref.: B. Oswald et al., Photochem. Photobiol. 74 (2001) 237	
UR-648-c UR-648-n	-CRB -NHS	A: 648 nm (log ϵ 4.86); E: 670 nm; QY moderate	Ref: M. Link (BOx; dimethyl derivative); the NHS ester is a label for proteins and amines	
UR-649-d	-NNN	A: 649 nm (log ϵ 4.72); E: 669 nm; QY ~0.01 in water	blue click label; ref.: diploma thesis J. Kleim, 2009 (BOx label)	
UR-650-j	-MAL	A: 650 nm (log ϵ 4.76); E: 668 nm; QY 0.01 in water but 0.03 in MeOH	thiol label with spacer group; ref.: diploma thesis J. Kleim, 2009 (BOx label); QY probably higher once conj. to protein	
UR-651-u	-CCH	A: 651 nm (log ϵ 4.86); E: 673 nm	blue click label (alkyne); ref.: P. Kele et al.; Org. Biomol. Chem., 2009; DOI: 10.1039/b907741c	
UR-652-e UR-652-x	-CRB -NHS	A: 648 nm (log ϵ 4.85); E: 671 nm	ref: M. Link; PhD thesis, 2010 (BOx label; diethyl derivative); the NHS ester is a label for proteins and amines	
UR-661-v	-NHS	A: 661 nm (log ϵ 5.20); E: 680 nm; QY 0.05; much higher if conj. to HSA; τ 1.4 ns.	a.k.a. RG-661; undergoes slight longwave shift on conj.; ref.: B. Oswald et al., Photochem. Photobiol. 74 (2001) 237; used as an acceptor label in a FRET immunoassay along with UR-635-n: Anal. Biochem. 280 (2000) 272	

UR-662-c UR-662-n	-CRB -NHS	A: 662 nm (log ϵ 5.22); E: 671 nm; QY up to 0.2 on protein	Dicyanomethylene squarylium dye; ref.: Gruber et al.; J. Fluoresc. 15 (2005) 207; the NHS ester is a label for proteins and amines	
UR-663-I	-NNN	A: 663 nm (log ϵ 5.0 in MeOH); E: 718 nm	click label; R = -(CH ₂) ₂ -N ₃ ; ref.: P. Kele et al.; Org. Biomol. Chem., 2009; ; DOI: 10.1039/ b907741c	
UR-664-o	-CCH	A: 664 nm (log ϵ 5.0 in MeOH); E: 718 nm	click label; R = -CH ₂ -C≡CH; ref.: P. Kele et al.; Org. Biomol. Chem., 2009; DOI: 10.1039/ b907741c	
UR-667-s	-NHS	A: 667 nm (log ϵ 5.20); E: 685 nm; QY 0.04; much higher if conj. to HSA.	a.k.a. RG-667; undergoes slight longwave shift on conj.; ref.: B. Oswald et al., Photochem. Photobiol. 74 (2001) 237; also binds to HSA by electrostatic interaction.	
UR-683-j	-CLO	A: 683 nm (in MeOH); E: 670 nm (MeOH); QY 0.10 in MeOH but 0.51 in toluene	amino-reactive chlorocyanine dye; a.k.a. FEW S-2086; soluble in MeOH; insoluble in water; used to label nanoparticles carrying amino groups	
UR-678-h UR-678-m	-CRB -NHS	A: 644 nm (MeOH); E: 666 nm; QY: 0.29 in MeOH but lower in water; log ϵ > 5.3	a.k.a. FEW's S-0247; the NHS ester is a cyanine label for amines and proteins; moderately soluble in water	
UR-702-u	-NHS	A: 702 nm (log ϵ 5.16); E: 718 nm; QY 0.005; much higher if conj. to HSA.	a.k.a. RG-702; undergoes slight longwave shift on conj. to proteins; ref.: B. Oswald et al., Photochem. Photobiol. 74 (2001) 237	
UR-710-c UR-710-n	-CRB -NHS	A: 710 nm (log ϵ 5.32); E: 718 nm; QY up to 0.3 on protein	longwave absorber; the NHS ester is a label for proteins and amines; ref. B. Wetzl et al.; J. Chromatogr. 793B (2003) 83.	

UR-747-c	-000	A: 747 nm (MeOH); E: 774 nm (MeOH)	non-reactive; a.k.a. FEW S-2137; soluble in MeOH and toluene; insoluble in water; can be used to fluorescently dope silica nanoparticles	
UR-781-e	-CLO	A: 781 nm (log ε 5.4) before conj. to amine; 621 nm (log ε ca 5.29) after conj. to amine; E: not detectable before conj.; 736 nm after conj.	amino-reactive chlorocyanine dye; a.k.a. FEW S-0749; S. Saleh et al.; 2009; suited for labeling particles carrying amino groups (in MeOH solution). Insoluble in water.	
UR-781-e	-CLO	A: 781 nm (log ε 5.4) before conj. to amine; A: 621 nm (log ε ca 5.29) after conj. to amine; E: not detectable before conj.; 736 nm after conj.	amino-reactive chlorocyanine dye of the chameleon type; a.k.a. FEW S-0749; suited for labeling particles carrying amino groups (in MeOH solution). Insoluble in water; ref.: H. Mader et al.; Ann. NY Acad. Sci. 1130 (2008) 218	
UR-783-a	-CLO	A: 783 nm (log ε 5.4) in MeOH before conj. to amine; A: 617 nm (log ε ca 5.27) in water after conj. to amine; E: not detectable before conj.; 663 nm after conj.	amino-reactive chlorocyanine label of the chameleon type; a.k.a. FEW S-0121; S. Saleh et al.; 2009; good protein label (in buffer of pH 8). Soluble in DMF, MeOH; less soluble in water; also suited for labeling particles carrying amino groups (in MeOH)	
UR-791-u	-CLO	A: 791 nm (MeOH); E: 805 nm (MeOH); very high log ε; (> 5.3); spectra distinctly shortwave-shifted after conj. to protein	amino-reactive chlorocyanine label of the chameleon type; a.k.a. FEW S-2168; soluble in DMF and MeOH; less so in water	
UR-800-i	-CLO	A: 800 nm (log ε 5.37) but 806 nm in MeOH; before conj. to amine; A: 663 nm (log ε ca 5.25) in water after conj. to amine; E: not detectable before conj.; E: 710 nm after conj.	best chlorocyanine type of NIR chameleon label for proteins; a.k.a. FEW S-0378; S. Saleh et al.; 2009; ; soluble in DMF, MeOH and – less so – in water; also used to label silica nanoparticles: H. Mader et al.; Ann. NY Acad. Sci. 1130 (2008) 218	
UR-820-o	-CLO	A: 820 nm (log ε 5.41) in MeOH before conj. to amine; 657 nm (log ε ca 5.30) (in water) after conj. to amine; E: not detectable before conj.; at 785 nm after conj. to amine	chameleon type of protein label and label for amines (in methanol solution); chlorocyanine dye; a.k.a. FEW S-0306 (Na salt) or S-2161 (TEA salt); S. Saleh et al.; 2009; protein label (in buffer of pH 8). Soluble in DMF, MeOH and – less so – in water; spectra strongly depend on concentration of dye (tends to aggregate)	

UR-973-y	-000	A: 973 nm (MeOH); E: unknown	Non-reactive; a.k.a. FEW S-2058; soluble in MeOH and toluene; insoluble in water; used to fluorescently dope silica nanoparticles	
UR-996-b	-000	A: 996 nm (MeOH); E: unknown	Non-reactive; a.k.a. FEW S-2104; soluble in MeOH and toluene; insoluble in water; can be used to fluorescently dope silica nanoparticles	

.. end