Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supplementary Information

Rewritable, Light-Driven Recordings in a Full-Color Fluorescent-Dye-Diffused Polydimethylsiloxane Elastomer

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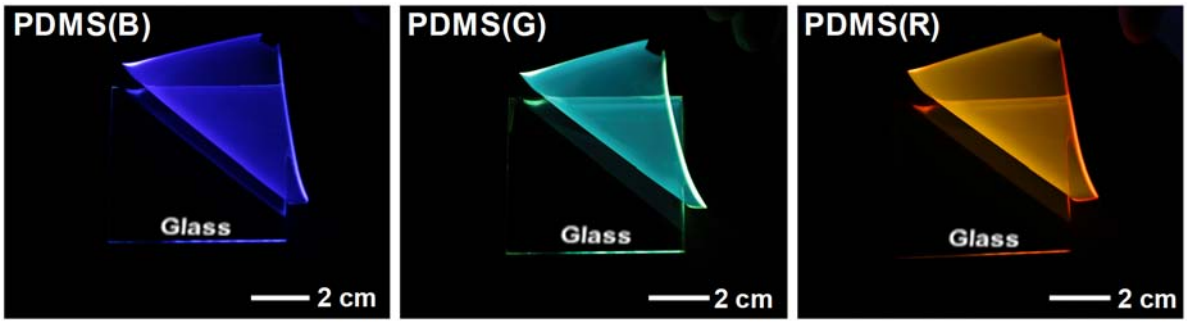

Fig. S1 Photographs of cured-PDMS samples delaminated from the dye-coated glass substrates. The THF solvent was used for dye dissolution in samples with 1 wt.% concentration.

	Dye fraction (wt%, in chloroform)	Glass (g)	Glass+Dye (g)	Dye (g)	Dye fraction (wt%, in PDMS)
Blue dye	0.1wt%	9.92965	9.92973	0.00008	0.0032
	0.5wt%	9.92427	9.92465	0.00038	0.0152
	1.0wt%	9.90396	9.90468	0.00072	0.0288
	1.5wt%	9.92746	9.92861	0.00115	0.046
Green dye	0.1wt%	9.88978	9.88984	0.00006	0.0024
	0.5wt%	9.88783	9.88818	0.00035	0.014
	1.0wt%	9.93607	9.93672	0.00065	0.026
	1.5wt%	9.89434	9.89538	0.00104	0.0416
Red dye	0.1wt%	9.90705	9.90714	0.00009	0.0036
	0.5wt%	9.9177	9.91804	0.00034	0.0136
	1.0wt%	9.92736	9.92805	0.00069	0.0276
	1.5wt%	9.85543	9.85651	0.00108	0.0432

Fig. S2 Calculated dye fractions in PDMS (wt.%, in PDMS) corresponding to those in chloroform solvent (wt.% in solvent). The weight of PDMS (2.5 g) was the same for all samples.

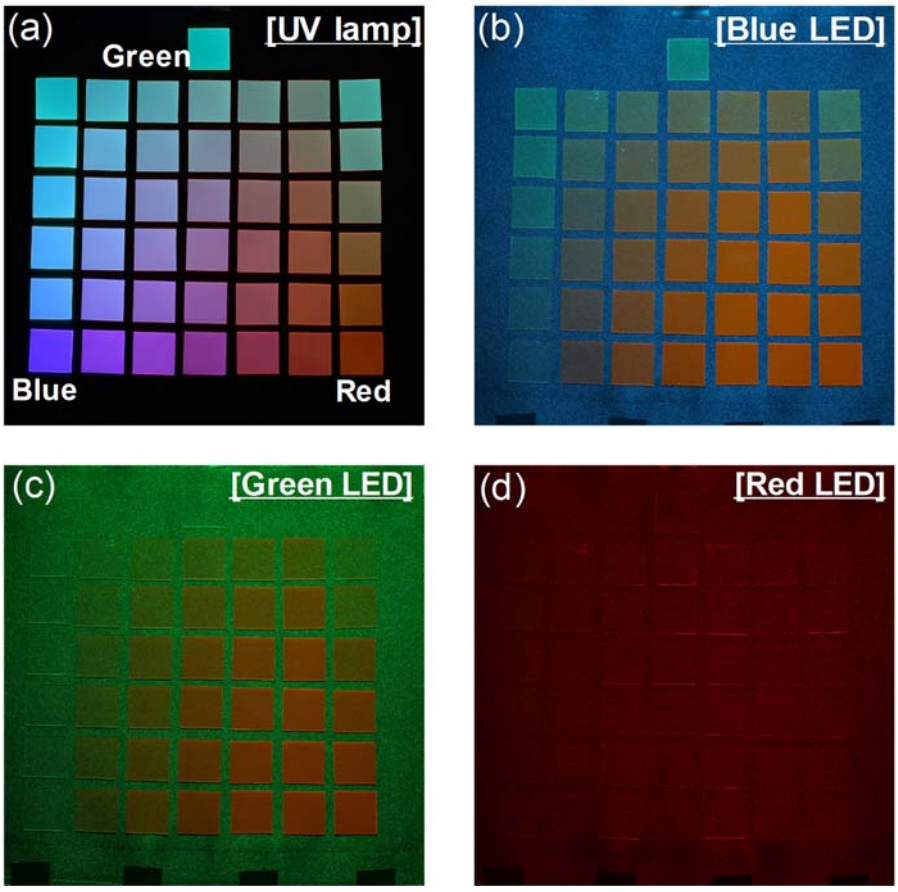

Fig. S3 Photographs of all dye-diffused PDMS used in this work under (a) UV lamp, (b) blue LED, (c) green LED, and (d) red LED light irradiation.

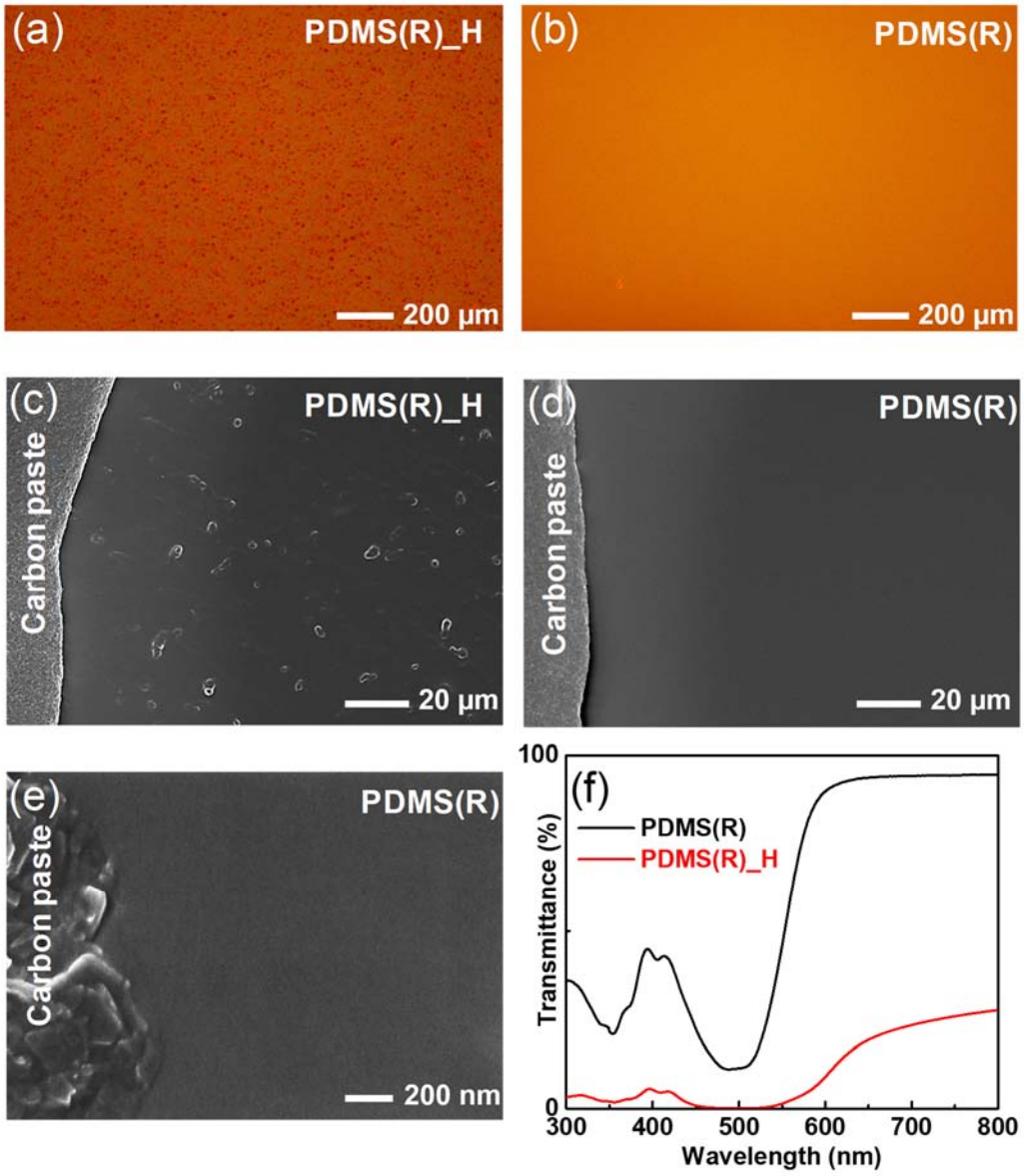

Fig. S4 Comparison between dye-aggregated PDMS (PDMS(R)_H) and dye-diffused PDMS (PDMS(R)). The PDMS(R)_H sample with high dye concentration (~8.5 times higher) was intentionally fabricated to highlight uniform dye distribution in PDMS(R). (a)–(b) optical microscope images, (c)–(e) SEM images and (f) transmittance spectra.

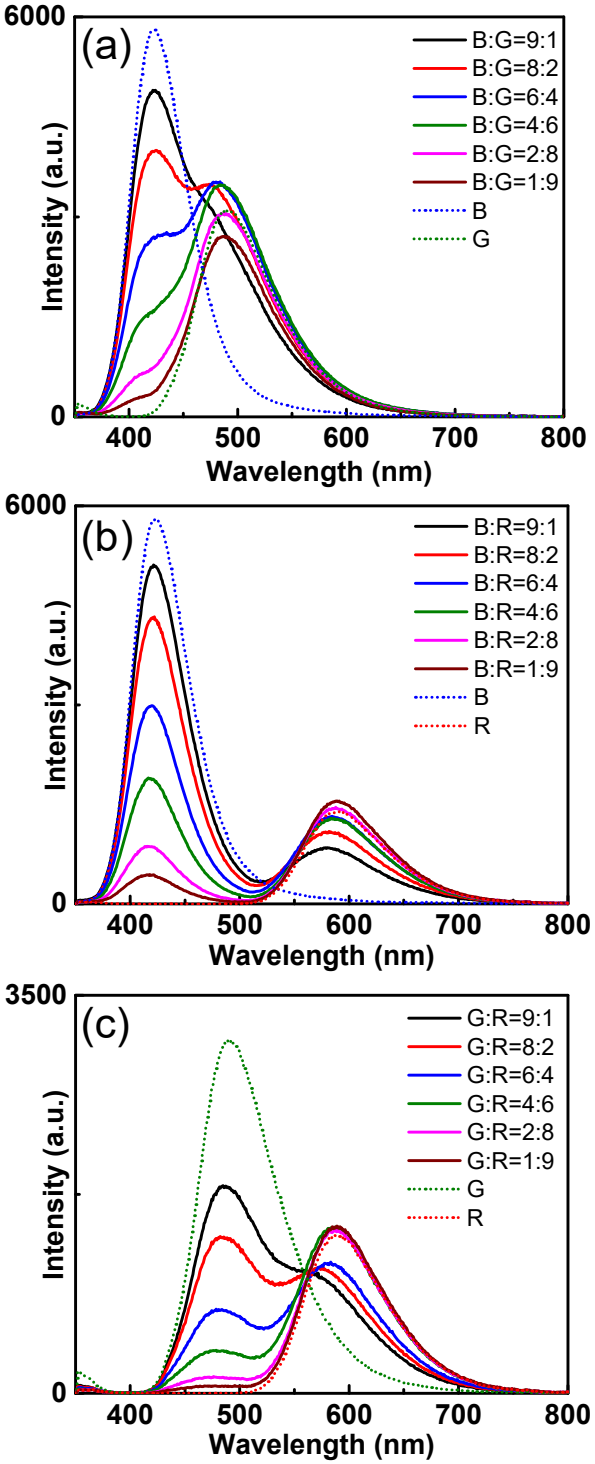

Fig. S5 Photoluminescence spectra obtained from all (a) PDMS(B+G), (b) PDMS(B+R), and (c) PDMS(G+R) samples used in this work.

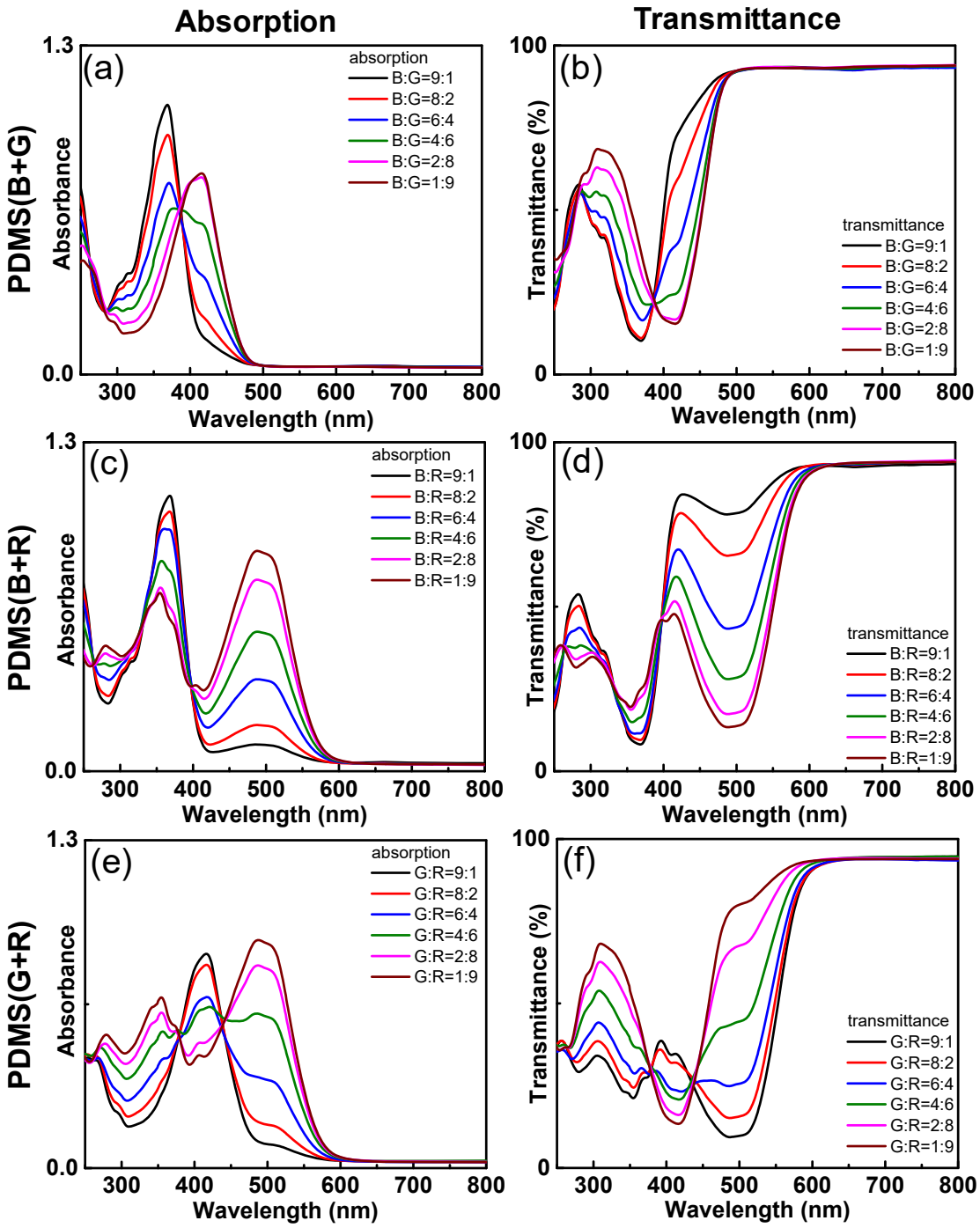

Fig. S6 Absorption and transmittance spectra obtained from all (a), (b) PDMS(B+G); (c), (d) PDMS(B+R); and (e), (f) PDMS(G+R) samples used in this work.

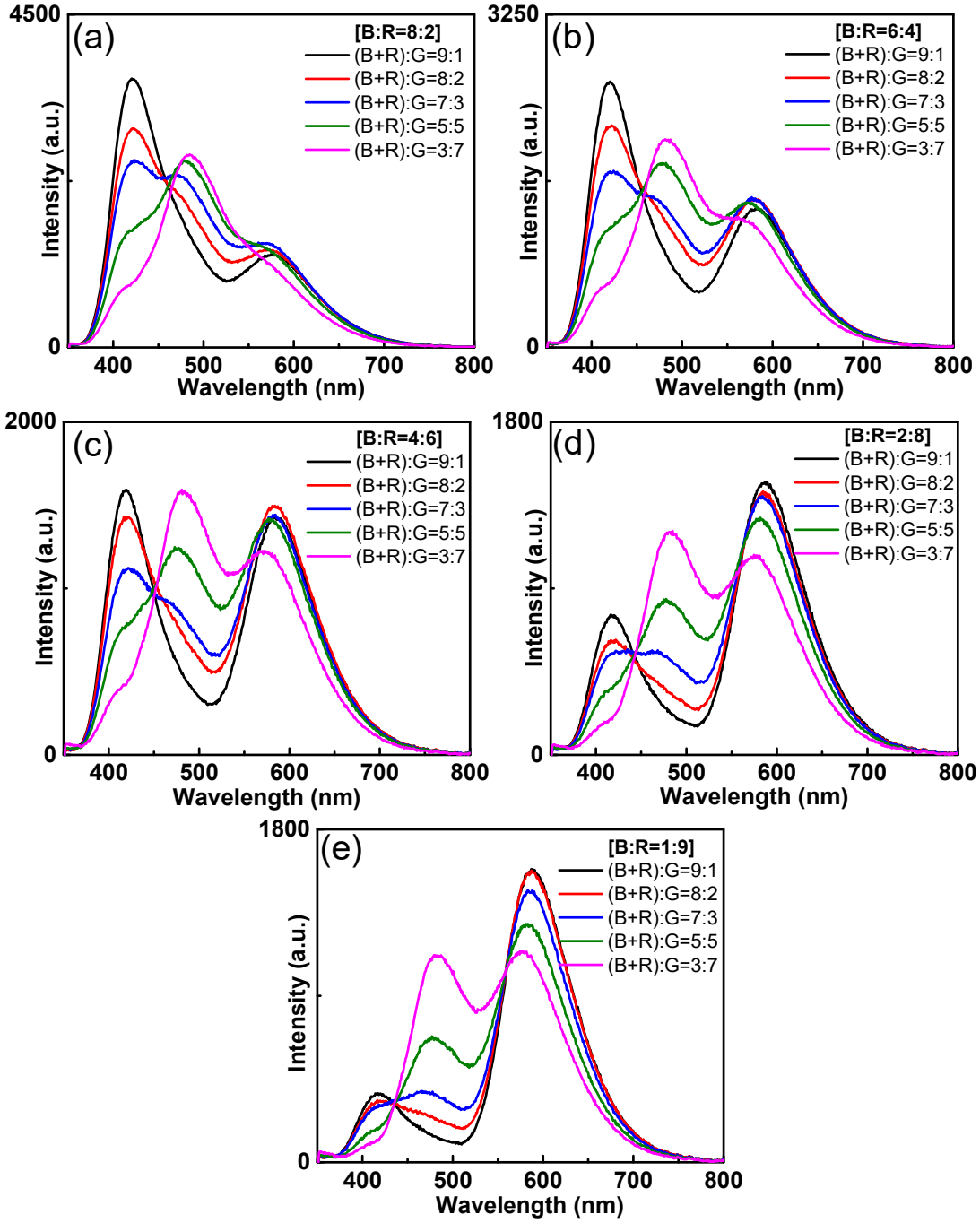

Fig. S7 Photoluminescence spectra obtained from all PDMS(B+G+R) samples used in this work. Because green dye was added in the mixed blue and green dye solution, the graphs indicate the blue:green weight ratios of (a) 8:2, (b) 6:4), (c) 4:6, (d) 2:8, and (e) 1:9, respectively.

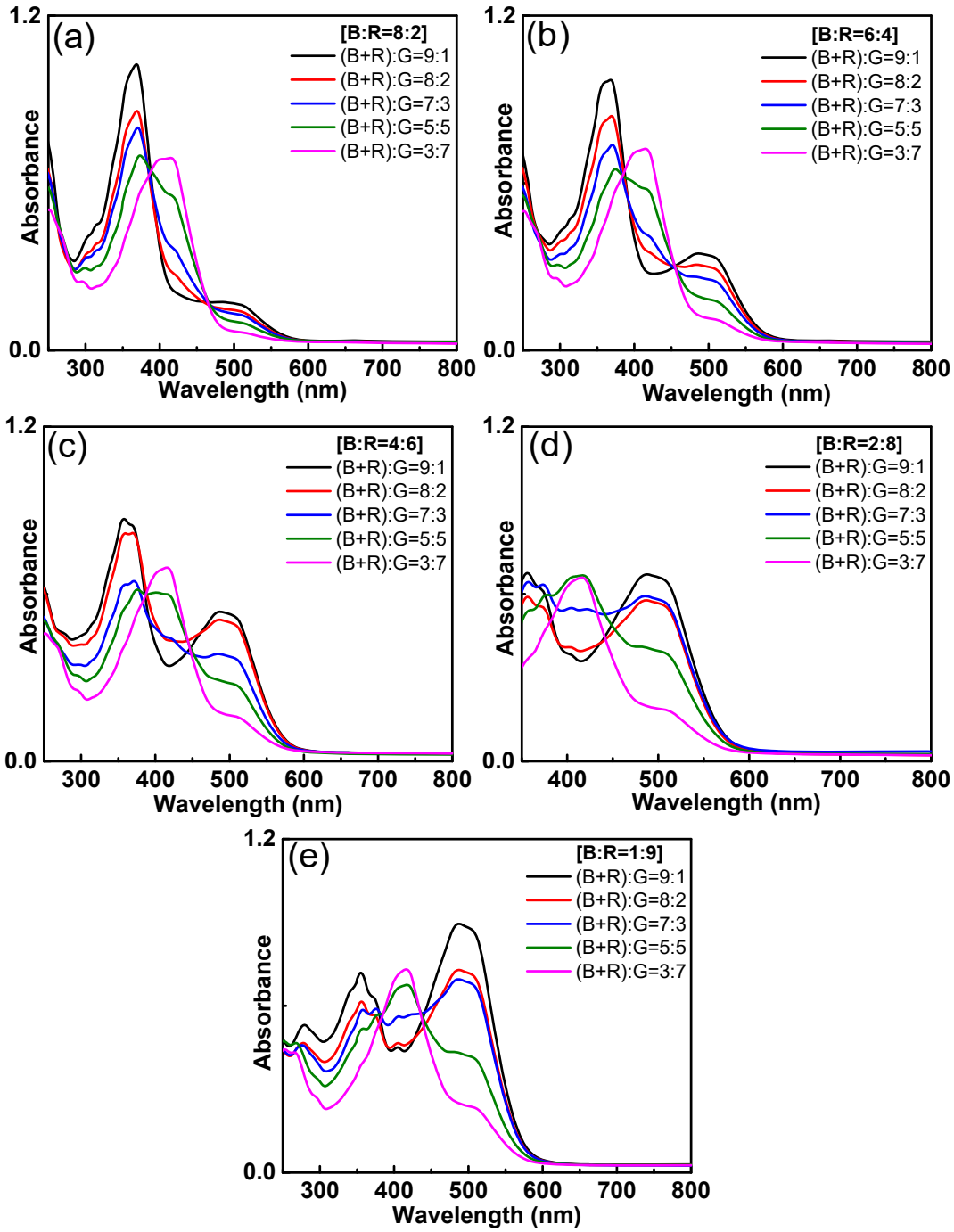

Fig. S8 Absorption spectra obtained from all PDMS(B+G+R) samples used in this work. The graphs indicate the blue:green weight ratios of (a) 8:2, (b) 6:4), (c) 4:6, (d) 2:8, and (e) 1:9, respectively.

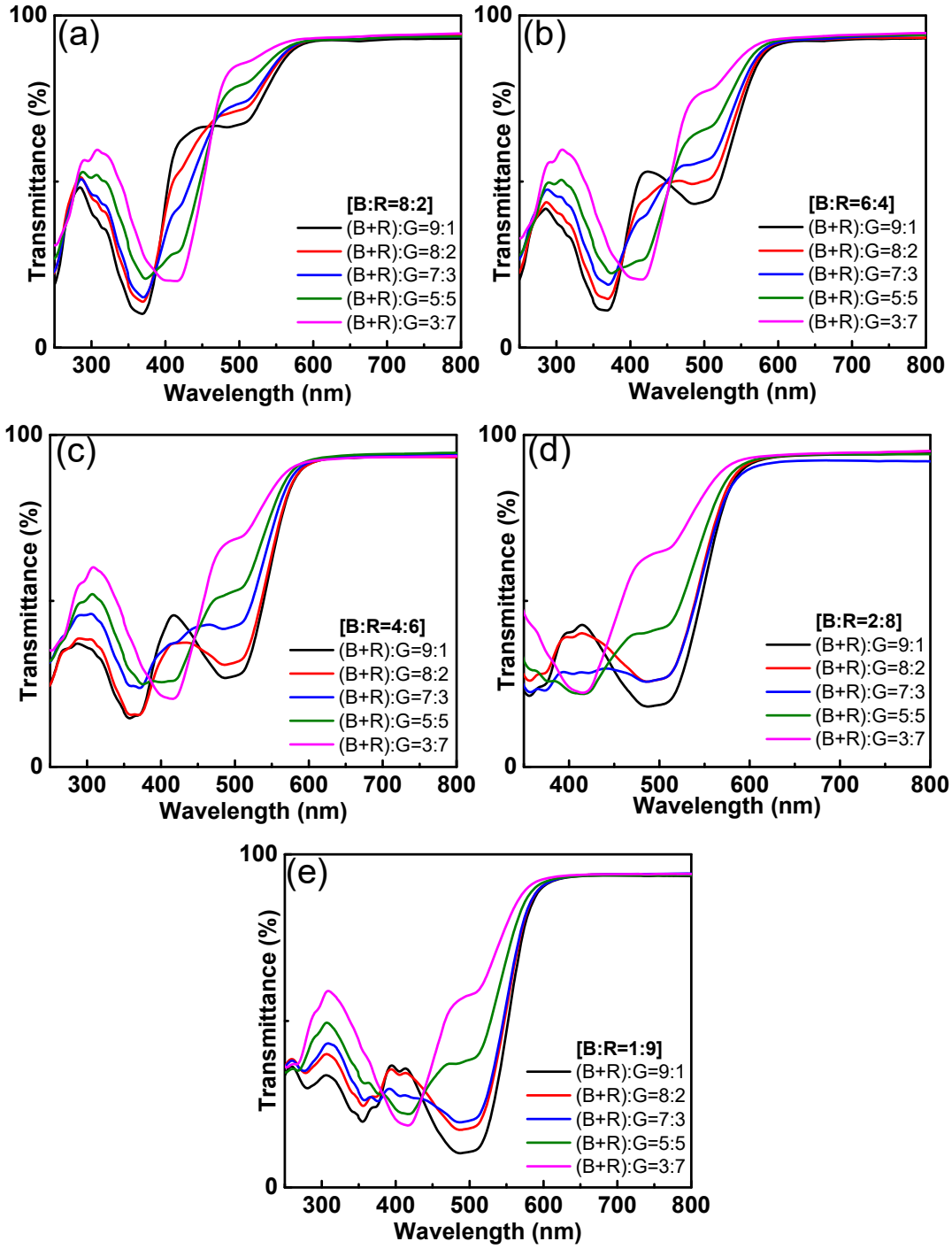

Fig. S9 Transmittance spectra obtained from all PDMS(B+G+R) samples used in this work. The graphs indicate the blue:green weight ratios of (a) 8:2, (b) 6:4), (c) 4:6, (d) 2:8, and (e) 1:9, respectively.

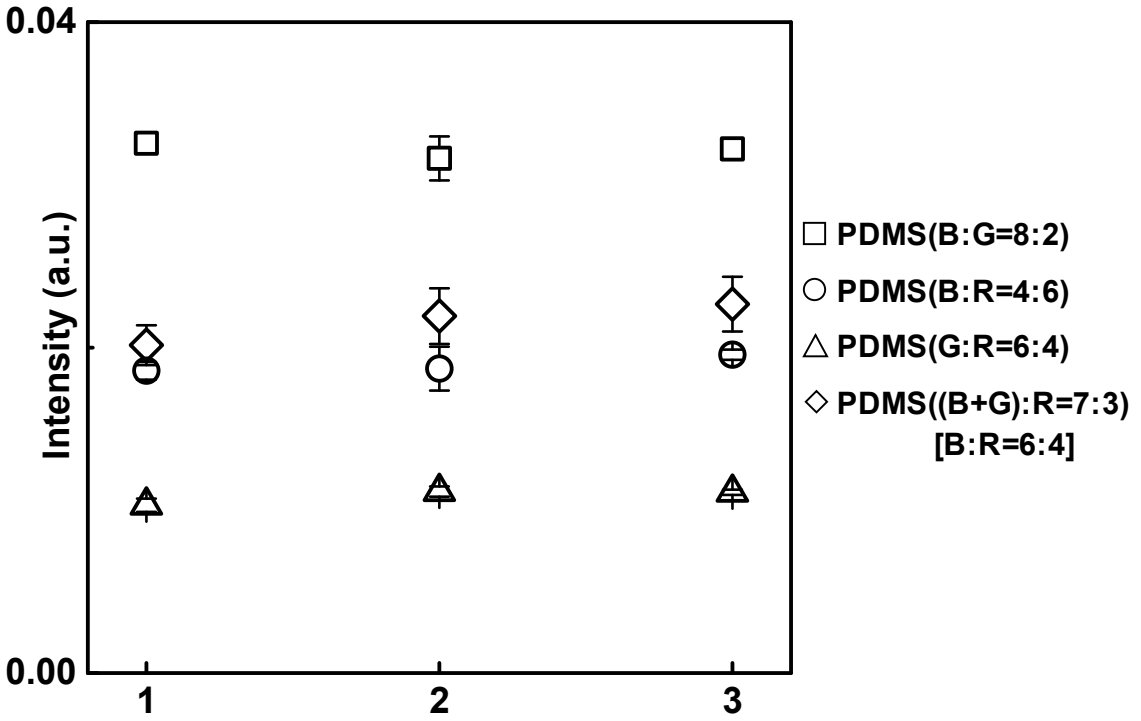

Fig. S10 Fluorescence intensities according to position from bottom (denoted as 1) to top (denoted as 3).

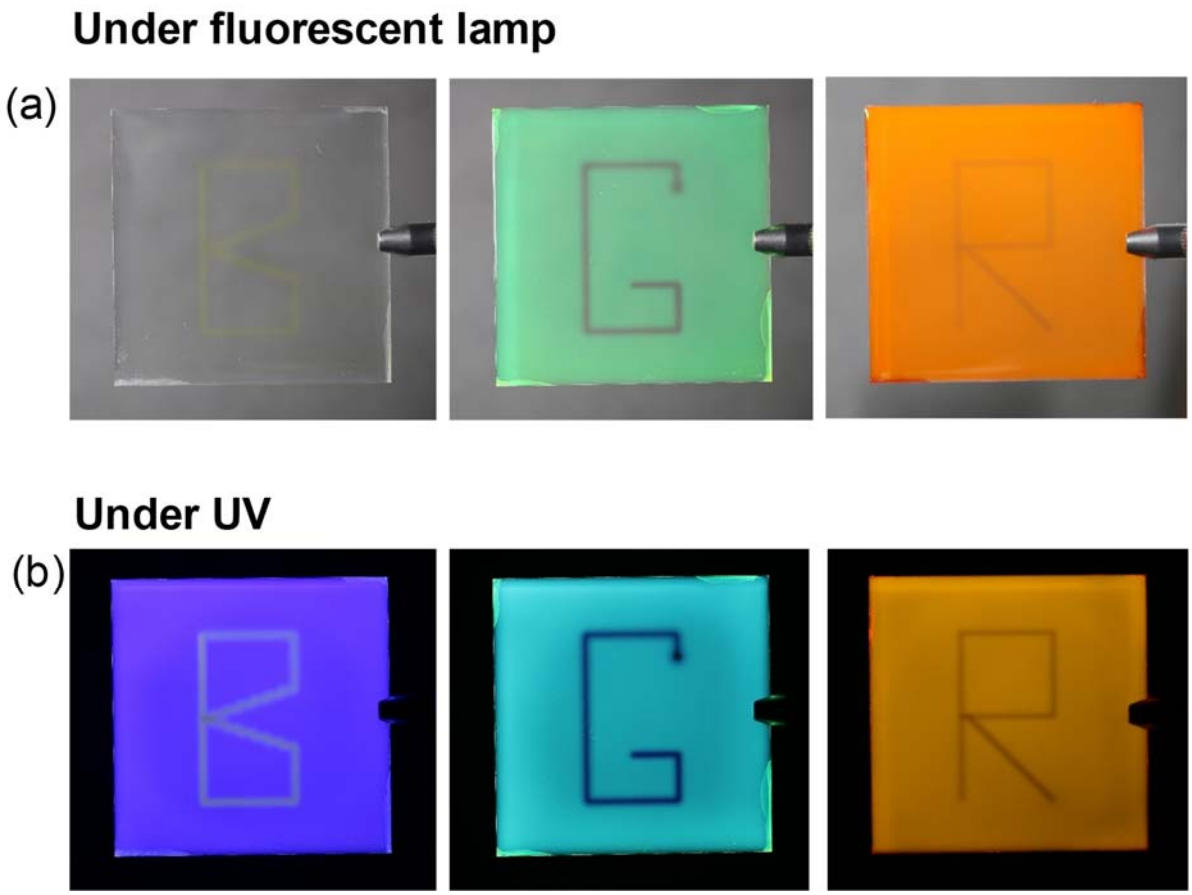

Fig. S11 Photographs of PDMS(B), PDMS(G), and PDMS(R) under (a) a fluorescent lamp and (b) UV radiation, after blue laser (405 nm) irradiation.

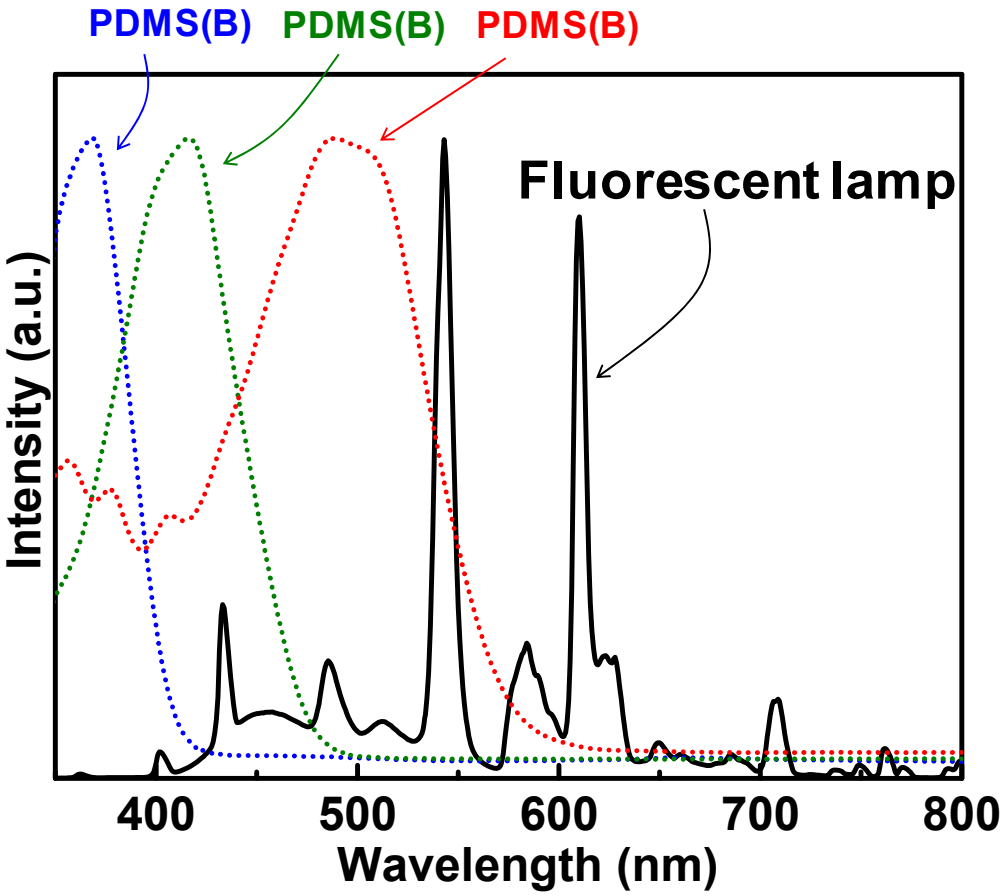

Fig. S12 Luminescence spectra of the fluorescent lamp used in the laboratory. Absorption spectra of PDMS(B), PDMS(G), and PDMS(R) are also indicated by the dotted line to show overlap with the lamp's luminescence.

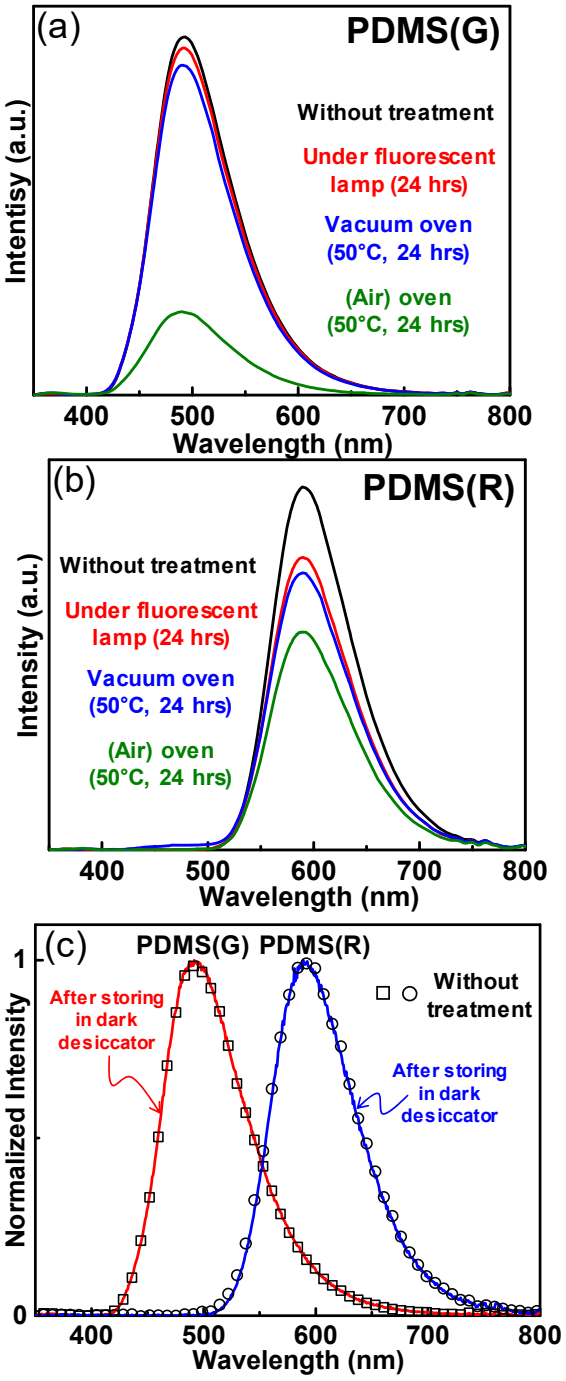

Fig. S13 (a) PL spectra obtained from PDMS(G) and (b) PDMS(R) after light (under fluorescent lamp), heat (vacuum-oven, 50 °C), and heat + moisture (air-oven, 50 °C) treatment for 24 h. (c) PL spectra of both samples after storing in dark desiccator for 24 hours.