Supporting Information

Facile fabrication of polyvinyl alcohol-based hydrophobic, fluorescent film via Hantzsch reaction for broadband UV protection

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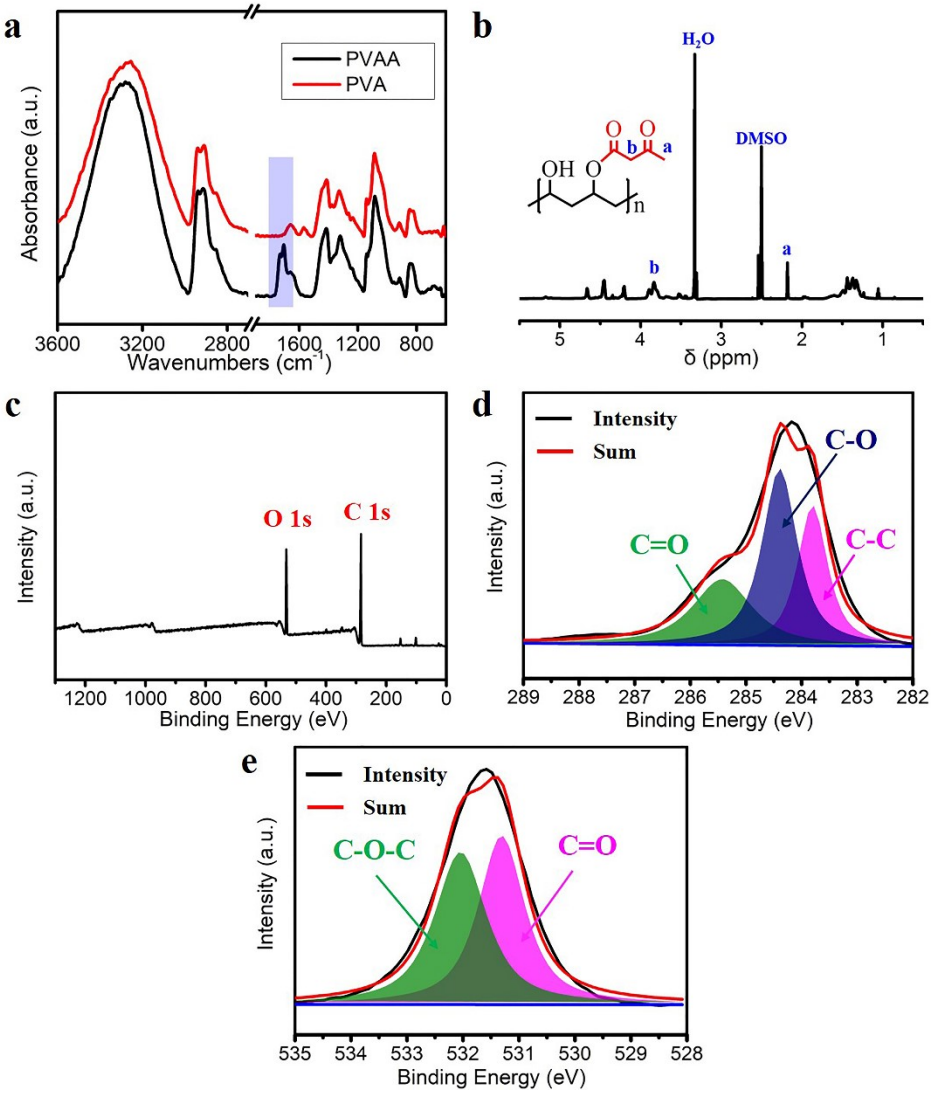

Fig. S1 (a) FT-IR spectra of PVA, PVAA, and fluorescent film, (b) ^{1}H NMR spectra of PVAA in DMSO-d_6, (c) XPS wide-scan spectra of PVAA film, (d) high-resolution C1s spectra of PVAA, (e) and high-resolution O1s spectra of PVAA.

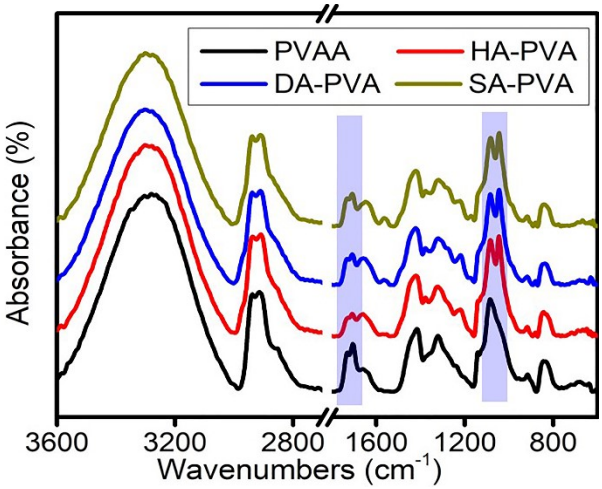

Fig. S2 FT-IR spectra of PVAA and HA-PVA, DA-PVA, and SA-PVA films films.

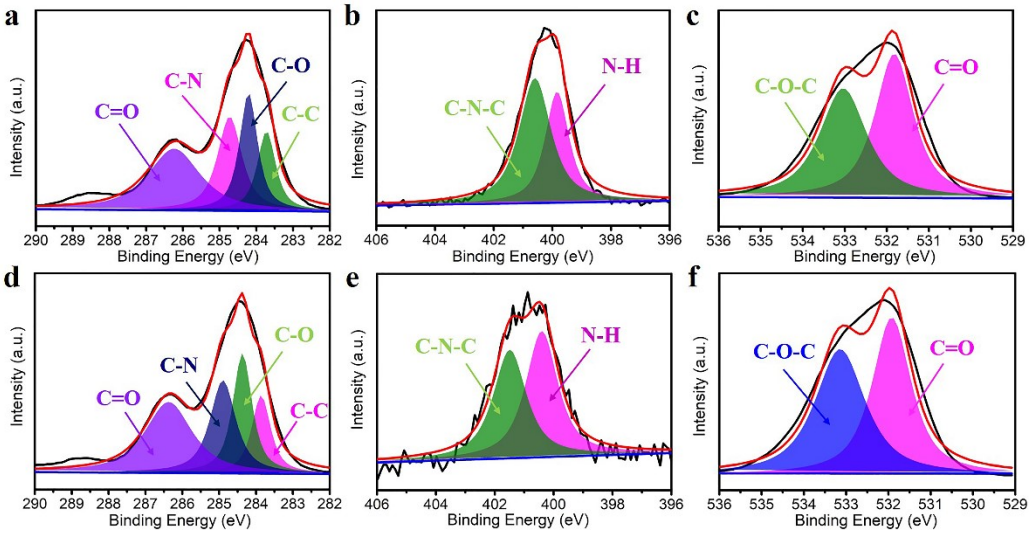

Fig. S3 High-resolution spectra of the HA-PVA film (a) C1s, (b) N1s, (c) O1s, and high-resolution spectra of the SA-PVA film (d) C1s, (e) N1s, (f) O1s.

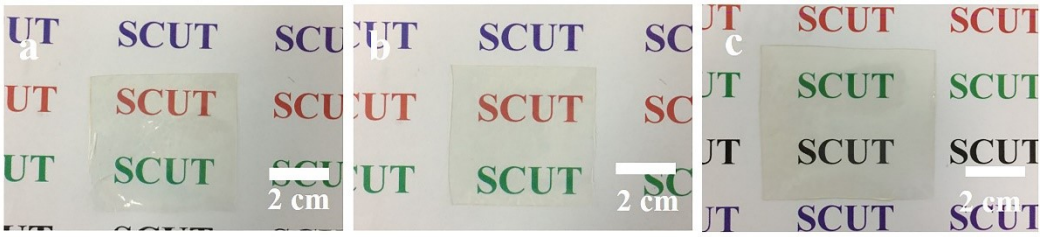

Fig. S4 Photograph of (a) HA-PVA, (b) SA-PVA, and (c) PVAA film.

Table S1 Elemental analysis of PVA, PVAA, and FA-PVA-0.8 film

Sample	Element content (%)		
	N	C	H
PVAA	0	51.75	8.62
HA-PVA	0.33	49.49	9.69
DA-PVA	0.32	49.83	9.08
SA-PVA	0.52	48.74	9.44

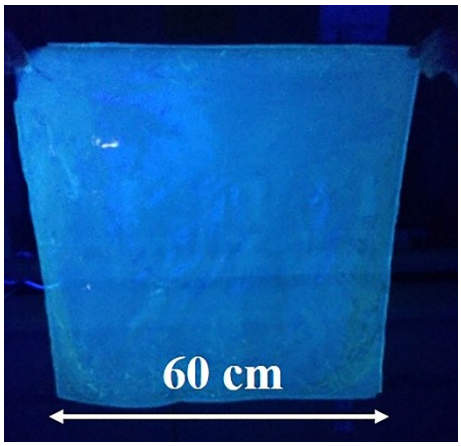

Fig. S5. Digital photos of DA-PVA film (60 cm◊60 cm) under 365 nm UV-light.

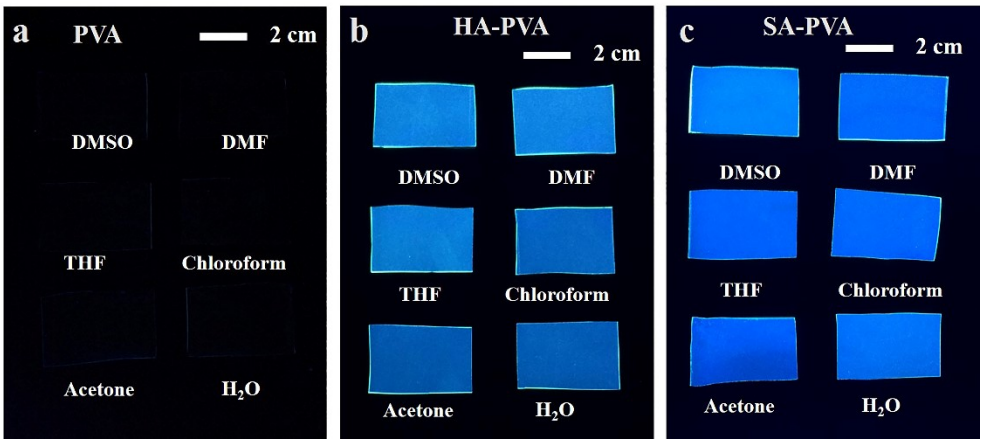

Fig. S6 Digital photos of PVA (a), HA-PVA (b), and SA-PVA(c) film under 365 nm UV-light radiation after soaking in different solvents for 24 h.

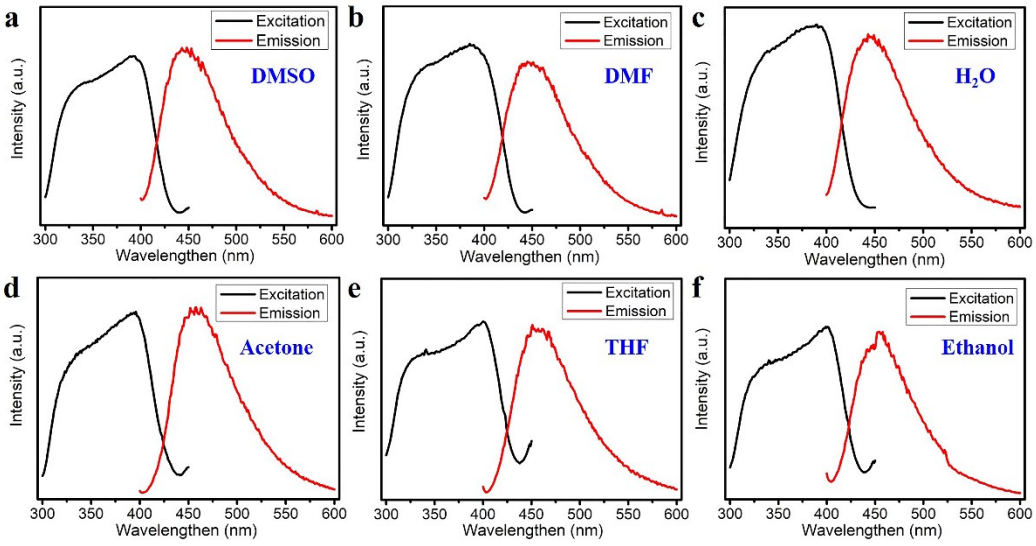

Fig. S7 Fluorescence spectra of DA-PVA film with soaking in different solvents for 24 h.

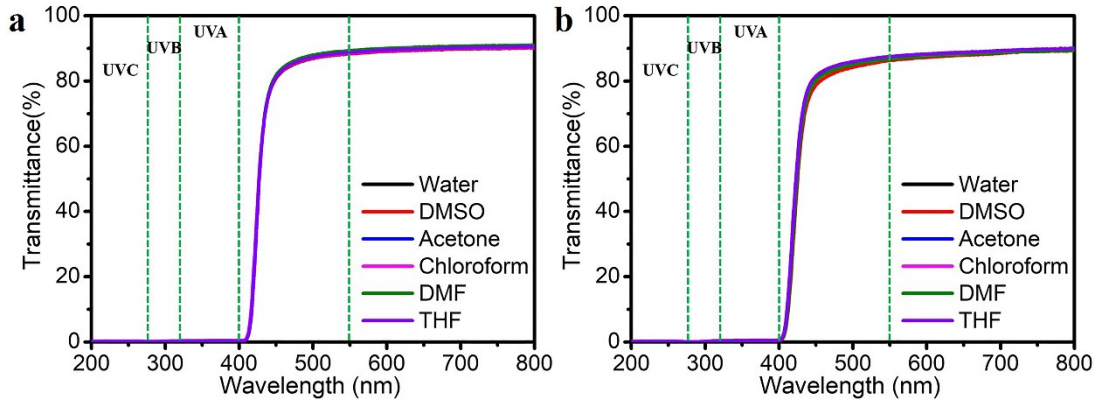

Fig. S8 UV–vis transmittance curves of HA-PVA (a) and SA-PVA (b) film after soaking in different solvents for 24 h.

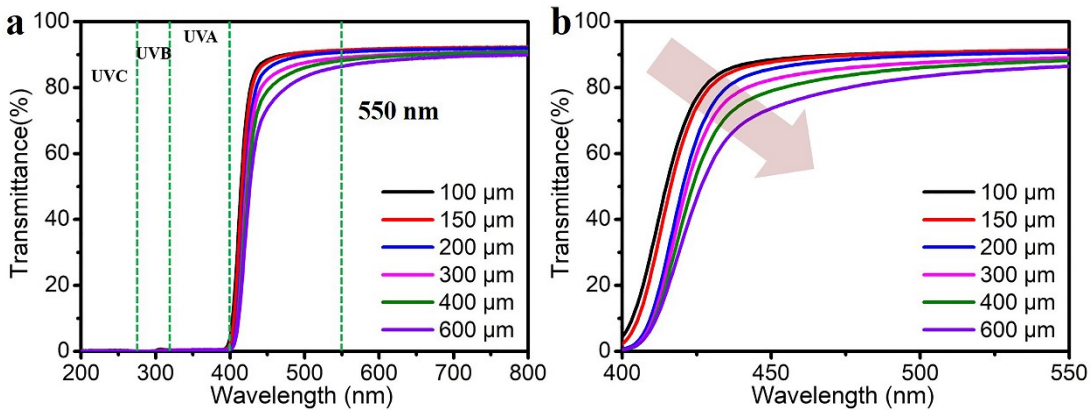

Fig. S9 (a) UV–vis transmittance curves of DA-PVA fluorescent film with different thicknesses, (b) magnified images from 400 to 550 nm wavelengths.

Table S2 The transparency and UV-blocking performance of DA-PVA film with different thicknesses.

Samples	**Thickness (μm)**					
	100	150	200	300	400	600
UV-blocking at 400 nm	94%	97%	100%	100%	100%	100%
Transmittance at 550 nm	91%	91%	90%	89%	88%	86%

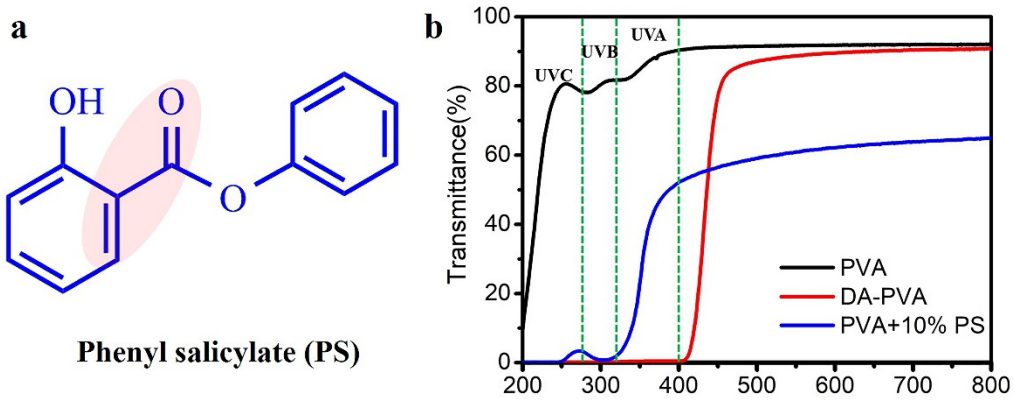

Fig. S10 (a)The chemical structure of phenyl salicylate and (b) UV–vis transmittance curves of PVA, DA-PVA, and PVA/PS film.