Supplementary information for

Direct and sensitized photolysis of dispersed photoacid generators to formulate water-borne photopolymers

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Table S1 Effect of milling period^{a)} on particle sizes of **3a** dispersed in a PVA solution at 800 rp

Milling time (hr)	Particle size (nm)	PDI ^{b)}
1	510	0.194
2	436	0.168
3	368	0.183
4	535	0.420
5	558	0.428

a) Diameter of beads = 0.1 mm. b) Polydispersity index.

Sample No	Onium salt	Sensitiser	PVA solution ^{a)}	Diameter of	Particle size
				ZrO ₂ bead	(nm)
D-1	1: 500 mg	non	9.50 g	0.3 mm	411
D-2	1: 288 mg	3a : 164 mg	9.50 g	0.3 mm	426
D-3	2a : 230 mg	3a : 260 mg	9.50 g	0.3 mm	354
D-4	2a : 325 mg	3a : 175 mg	9.50 g	0.3 mm	342
D-5	2a : 394 mg	3a : 106 mg	9.50 g	0.3 mm	347
D-6	2a : 325 mg	3c : 175 mg	9.50 g	0.3 mm	372
D-7	2a : 378 mg	3c : 124 mg	9.50 g	0.3 mm	590
D-8	2a : 310 mg	3d : 190 mg	9.59 g	0.3 mm	180
D-9	2a 303 mg	4 : 118 mg	9.50 g	0.3 mm	324
D-10	2a : 340 mg	4 : 161 mg	9.50 g	3 mm	523
D-11	2a : 270 mg	5 : 230 mg	9.50 g	0.3 mm	530
D-12	2a : 270 mg	5 : 230 mg	9.50 g	3 mm	647
D-13	2a : 340 mg	6 : 160 mg	9.50 g	0.3 mm	286

Table S2 Formulations and properties of photosensitive aqueous dispersions.

a) A 5 wt% aqueous solution of PVA of DP=500.

Preparative way of	Relative sensitivity ^{a)}			
dispersion of 2a and 3a	Molar ratio of 2a and 3a			
	1:1	2:1		
Co-milling	0.36	1.0		
Physical mixing	0	0		
Mixing followed by milling	0	0.5		

Table S3 Dependence of photosensitivity on preparative ways of aqueous dispersions of **2a** and **3a**.

a) Photosensitivity of a 2:1 co-milled mixture was used as a standard.

Sample No	Run in	PAG/Sens ^{a)}	PAG/Sens. ^{b)}	Dispersion	PVA.	Water	Crosslinker
	Table 2		(mol/mol)	sample	solution ^{c)}		
P-1		1/non	1/0	D-1: 1.00 g	2.00 g	0.50 g	8 : 41.25 mg
P-2		1/non	1/0	D-1: 1.00 g	2.00 g	0.50 g	9 : 38.17 mg
P-3		1/3a	1/1	D-2: 1.00 g	2.00 g	0.50 g	9 : 32.11 mg
P-4	Run-1	2a/3a	0.5/1	D-3: 1.00 g	2.00 g	0.50 g	9 : 37.10 mg
P-5	Run-2	2a/3a	1/1	D-4: 1.00 g	2.00 g	0.50 g	9 : 37.98 mg
P-6	Run-3	2a/3a	2/1	D-5: 1.00 g	2.00 g	0.50 g	9 : 34.53 mg
P-7	Run-4	2a/3c	0.5/1	D-6: 1.00 g	2.00 g	0.50 g	9 : 38.63 mg
P-8	Run-5	2a/3c	1/1	D-7: 1.00 g	2.00 g	0.50 g	9 : 36.03 mg
P-9		2a/3d	1/1	D-8: 1.00 g	2.00 g	0.50 g	9 : 33.72 mg
P-10	Run-6	2a/4	1/1	D-9: 1.00 g	2.00 g	0.50 g	9 : 34.52 mg
P-11	Run-7	2a/4	1/1	D-10: 1.00 g	2.00 g	0.50 g	9 : 34.17 mg
P-12	Run-8	2a/5	1/1	D-11: 1.00 g	2.00 g	0.50 g	9 : 35.81 mg
P-13	Run-9	2a/5	1/1	D-12: 1.00 g	2.00 g	0.50 g	9 : 35.59 mg
P-14	Run-10	2a/6	1/1	D-13: 1.00 g	2.00 g	0.50 g	9 : 35.06 mg

Table 4S Formulations of photopolymers

a) Combination of a photoacid generator and a sensitiser. b) Molar ratio of a photoacid generator and a sensitiser. c) A 10 wt% aqueous solution of PVA of DP=1700.

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Fig. S1 Spectral changes of aqueous dispersions of (**A**) a 1:1 (mol/mol) mixture of **2a** and **3a** upon exposure to >350 nm light for 0, 20, 60 and 120 sec and (**B**) a 1:1 (mol/mol) mixture of **2a** and **5** upon exposure to >420 nm light for 0, 1, 2, 4 and 8 min, respectively.



Fig. S2 Absorption spectra of **3a** in cyclohexane (dotted line) and in an aqueous dispersion (solid line).





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