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Appendix A

For outdoor exposure

Table A.1.1 Viscosity Measurement of 0 % photosensitizer for original test sample at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.15	64.15	64.15	64.15				
0.40	95.35	95.30	95.50	95.38	1.49	0.49	1.23	1.00
0.24	84.20	84.30	84.30	84.27	1.31	0.31	1.29	1.13
0.16	76.60	76.75	76.55	76.63	1.19	0.19	1.19	1.09
0.08	70.30	70.20	70.30	70.27	1.10	0.10	1.25	1.19

Table A.1.2 Viscosity Measurement of 1.0 % photosensitizer for original test sample at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	63.75	63.85	63.85	63.82				
0.40	97.05	97.05	96.95	97.02	1.52	0.52	1.05	1.30
0.24	84.15	84.25	84.30	84.23	1.32	0.32	1.16	1.32
0.16	77.10	77.20	77.30	77.20	1.21	0.21	1.19	1.33
0.08	70.90	71.00	70.85	70.92	1.11	0.11	1.30	1.38

Table A.1.3 Viscosity Measurement of 1.5 % photosensitizer for original test sample at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	63.95	64.05	64.05	64.02				
0.40	95.70	95.85	95.90	95.82	1.50	0.50	1.25	1.01
0.24	84.55	84.35	84.50	84.47	1.32	0.32	1.33	1.16
0.16	78.40	78.25	78.20	78.28	1.22	0.22	1.38	1.24
0.08	71.00	71.20	71.00	71.07	1.11	0.11	1.30	1.38

Table A.1.4 Viscosity Measurement of 2.0 % photosensitizer for original test sample at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	63.85	63.85	63.75	63.82				
0.40	94.85	95.05	94.85	94.92	1.49	0.49	1.23	1.00
0.24	84.00	84.10	84.00	84.03	1.32	0.32	1.33	1.16
0.16	78.85	79.00	78.80	78.88	1.24	0.24	1.50	1.34
0.08	71.20	71.40	71.20	71.27	1.12	0.12	1.50	1.42

Table A.1.5 Viscosity Measurement of 0 % photosensitizer for 15 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	63.75	63.75	63.85	63.78				
0.40	98.50	98.50	98.45	98.48	1.54	0.54	1.35	1.08
0.24	84.45	84.50	84.40	84.45	1.32	0.32	1.33	1.16
0.16	76.70	76.50	76.60	76.62	1.20	0.20	1.25	1.14
0.08	70.00	70.10	70.10	70.07	1.10	0.10	1.25	1.19

Table A.1.6 Viscosity Measurement of 1.0 % photosensitizer for 15 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.65	64.65	64.60	64.63				
0.31	74.45	74.50	74.30	74.42	1.15	0.15	0.45	0.48
0.19	72.15	72.15	72.00	72.10	1.12	0.12	0.67	0.65
0.12	70.50	70.50	70.60	70.53	1.09	0.09	0.70	0.73
0.06	68.10	68.00	68.20	68.10	1.05	0.05	0.79	0.81

Table A.1.7 Viscosity Measurement of 1.5 % photosensitizer for 15 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.09	64.12	64.12	64.11				
0.32	74.69	74.69	74.50	74.63	1.16	0.16	0.47	0.51
0.19	70.88	70.95	70.90	70.91	1.11	0.11	0.55	0.58
0.13	69.22	69.31	69.22	69.25	1.08	0.08	0.61	0.64
0.06	67.06	66.88	66.87	66.94	1.04	0.04	0.63	0.64

Table A.1.8 Viscosity Measurement of 2.0 % photosensitizer for 15 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.03	64.06	64.19	64.09				
0.30	72.69	72.75	72.88	72.77	1.14	0.14	0.44	0.47
0.18	70.57	70.55	70.53	70.55	1.10	0.10	0.53	0.56
0.14	68.59	68.53	68.53	68.55	1.07	0.07	0.48	0.50
0.06	65.70	65.73	65.71	65.72	1.03	0.03	0.50	0.50

Table A.1.9 Viscosity Measurement of 0 % photosensitizer for 1 month at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.20	64.35	64.35	64.30				
0.40	96.50	96.30	96.30	96.37	1.50	0.50	1.25	1.01
0.24	84.00	83.95	83.85	89.93	1.31	0.31	1.29	1.13
0.16	76.90	76.90	77.10	76.97	1.20	0.20	1.25	1.14
0.08	70.40	70.50	70.40	70.43	1.10	0.10	1.25	1.19

Table A.1.10 Viscosity Measurement of 1.0 % photosensitizer for 1 month at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.09	64.12	64.12	64.11				
0.38	74.63	74.80	74.60	74.68	1.16	0.16	0.39	0.42
0.23	71.57	71.37	71.43	71.47	1.11	0.11	0.46	0.48
0.15	68.87	69.12	68.87	68.95	1.08	0.08	0.51	0.53
0.07	66.63	66.50	66.53	66.55	1.04	0.04	0.56	0.57

Table A.1.11 Viscosity Measurement of 1.5 % photosensitizer for 1 month at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.16	64.06	64.00	64.07				
0.36	76.40	76.53	76.50	76.48	1.19	0.19	0.49	0.53
0.22	71.57	71.09	71.28	71.17	1.11	0.11	0.49	0.51
0.15	69.62	69.56	69.59	69.59	1.09	0.09	0.57	0.59
0.07	66.62	66.42	66.50	66.51	1.04	0.04	0.52	0.53

Table A.1.12 Viscosity Measurement of 2.0 % photosensitizer for 1 month at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.03	64.06	64.19	64.09				
0.32	71.50	71.34	71.31	71.38	1.11	0.11	0.34	0.36
0.19	68090	69.09	68.91	68.97	1.08	0.08	0.39	0.40
0.13	67.06	67.25	67.18	67.16	1.05	0.05	0.37	0.38
0.06	65.84	65.69	65.72	65.75	1.03	0.03	0.41	0.41

Table A.1.13 Viscosity Measurement of 0 % photosensitizer for 2 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	63.60	63.75	63.75	63.70				
0.40	88.35	88.55	88.55	88.48	1.39	0.39	0.98	0.82
0.24	78.70	78.80	78.70	78.73	1.24	0.24	1.00	0.90
0.16	73.55	73.45	73.50	73.50	1.15	0.15	0.94	0.87
0.08	69.60	69.80	69.60	69.67	1.09	0.09	1.13	1.08

Table A.1.14 Viscosity Measurement of 1.0 % photosensitizer for 2 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.65	64.65	64.60	64.63				
0.43	81.00	81.00	81.05	81.02	1.25	0.25	0.52	0.59
0.26	74.15	74.15	74.20	74.17	1.15	0.15	0.55	0.59
0.17	70.30	70.50	70.30	70.37	1.09	0.09	0.51	0.53
0.09	68.80	68.80	68.60	68.73	1.05	0.05	0.57	0.59

Table A.1.15 Viscosity Measurement of 1.5 % photosensitizer for 2 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.03	64.03	64.03	64.03				
0.40	75.00	75.00	75.00	75.00	1.17	0.17	0.39	0.42
0.24	71.62	71.68	71.69	71.66	1.12	0.12	0.47	0.50
0.16	69.04	69.03	69.00	69.02	1.08	0.08	0.48	0.50
0.08	66.41	66.47	66.44	66.44	1.04	0.04	0.49	0.50

Table A.1.16 Viscosity Measurement of 2.0 % photosensitizer for 2 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.13	64.03	64.13	64.10				
0.37	72.18	72.31	72.34	72.28	1.13	0.13	0.33	0.35
0.22	70.48	70.50	70.55	70.51	1.10	0.10	0.43	0.45
0.14	67.88	67.84	67.60	67.77	1.06	0.06	0.40	0.41
0.07	66.28	66.31	66.22	66.27	1.03	0.03	0.46	0.47

Table A.1.17 Viscosity Measurement of 0 % photosensitizer for 3 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	64.00	64.05	64.05	64.03				
0.39	89.00	89.00	89.10	89.03	1.39	0.39	0.82	0.98
0.24	78.70	78.75	78.90	78.78	1.23	0.23	0.86	0.96
0.16	73.50	73.70	73.60	73.60	1.15	0.15	0.87	0.94
0.08	69.00	68.90	69.10	69.00	1.08	0.08	0.96	1.00

Table A.1.18 Viscosity Measurement of 1.0 % photosensitizer for 3 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	64.16	64.06	64.00	64.07				
0.24	70.90	71.03	71.07	71.00	1.11	0.11	0.42	0.45
0.15	69.16	69.09	69.03	69.09	1.08	0.08	0.52	0.56
0.10	66.82	66.75	66.94	66.84	1.04	0.04	0.44	0.45
0.05	66.65	65.53	65.66	65.65	1.03	0.03	0.52	0.52

Table A.1.19 Viscosity Measurement of 1.5 % photosensitizer for 3 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	64.03	64.03	64.03	64.03				
0.40	75.13	75.00	74.97	75.03	1.17	0.17	0.40	0.43
0.24	71.12	71.13	70.97	71.07	1.11	0.11	0.44	0.46
0.16	68.59	68.56	68.59	68.58	1.07	0.07	0.43	0.44
0.08	66.38	66.22	66.22	66.27	1.03	0.03	0.37	0.38

Table A.1.20 Viscosity Measurement of 2.0 % photosensitizer for 3 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	63.97	64.00	64.15	64.04				
0.28	70.53	70.40	70.43	70.45	1.10	0.10	0.34	0.36
0.17	67.94	68.10	68.00	68.01	1.06	0.06	0.35	0.36
0.11	66.85	66.85	66.90	66.87	1.04	0.04	0.35	0.36
0.06	65.46	65.50	65.40	65.45	1.02	0.02	0.36	0.36

Table A.1.21 Viscosity Measurement of 0 % photosensitizer for 4 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	65.81	65.81	65.84	65.82				
0.80	104.88	104.84	104.93	104.88	1.59	0.59	0.58	0.74
0.48	87.53	87.65	87.60	87.59	1.33	0.33	0.60	0.69
0.32	79.44	79.59	79.56	79.53	1.21	0.21	0.59	0.65
0.16	72.69	72.81	72.85	72.78	1.11	0.11	0.65	0.69

Table A.1.22 Viscosity Measurement of 1.0 % photosensitizer for 4 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	65.81	65.81	65.84	65.82				
0.20	70.76	70.80	70.72	70.76	1.08	0.08	0.40	0.43
0.12	69.52	69.53	69.56	69.54	1.06	0.06	0.51	0.49
0.08	68.46	68.34	68.31	68.37	1.04	0.04	0.51	0.50
0.04	66.98	67.10	67.00	67.03	1.02	0.02	0.51	0.50

Table A.1.23 Viscosity Measurement of 1.5 % photosensitizer for 4 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	65.69	65.65	65.66	65.67				
0.32	73.65	73.60	73.56	73.60	1.12	0.12	0.12	0.38
0.19	70.47	70.44	70.44	70.45	1.07	0.07	0.36	0.37
0.13	68.81	68.97	68.97	68.92	1.05	0.05	0.39	0.40
0.06	67.09	67.19	67.21	67.16	1.02	0.02	0.32	0.32

Table A.1.24 Viscosity Measurement of 2.0 % photosensitizer for 4 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	65.69	65.65	65.66	65.67				
0.38	74.62	74.50	74.56	74.56	1.14	0.14	0.35	0.37
0.22	71.00	70.96	70.91	70.96	0.08	0.08	0.34	0.36
0.15	69.19	69.15	69.15	69.16	1.05	0.05	0.33	0.34
0.08	67.62	67.66	67.66	67.65	1.03	0.03	0.39	0.40

Table A.1.25 Viscosity Measurement of 0 % photosensitizer for 5 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	64.50	64.49	64.46	64.48				
0.40	79.52	79.64	79.60	79.59	1.23	0.23	0.52	0.58
0.24	73.41	73.45	73.28	73.38	1.14	0.14	0.55	0.58
0.16	70.90	70.91	70.84	70.88	1.10	0.10	0.60	0.63
0.08	68.23	68.10	68.05	68.13	1.06	0.06	0.73	0.75

Table A.1.26 Viscosity Measurement of 1.0 % photosensitizer for 5 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	65.83	65.91	66.01	65.92				
0.45	79.80	79.85	79.77	79.81	1.21	0.21	0.43	0.47
0.27	74.28	74.18	74.35	74.27	1.13	0.13	0.45	0.48
0.18	71.25	71.11	71.30	71.22	1.08	0.08	0.43	0.45
0.09	68.36	68.29	68.32	68.32	1.04	0.04	0.44	0.45

Table A.1.27 Viscosity Measurement of 1.5 % photosensitizer for 5 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	65.89	66.00	65.82	65.90				
0.44	81.18	81.10	81.15	81.14	1.23	0.23	0.47	0.53
0.26	74.84	74.75	74.71	74.77	1.13	0.13	0.47	0.50
0.18	71.69	71.75	71.66	71.70	1.09	0.09	0.49	0.51
0.09	68.77	68.69	68.69	68.72	1.04	0.04	0.45	0.46

Table A.1.28 Viscosity Measurement of 2.0 % photosensitizer for 5 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	66.20	66.34	66.32	66.29				
0.35	71.46	71.38	71.28	71.37	1.08	0.08	0.22	0.23
0.21	69.85	69.91	69.83	69.86	1.05	0.05	0.24	0.24
0.16	68.17	68.01	67.91	68.03	1.03	0.03	0.21	0.22
0.07	67.82	67.93	67.82	67.86	1.02	0.02	0.30	0.30

Table A.1.29 Viscosity Measurement of 0 % photosensitizer for 6 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	65.81	65.69	65.87	65.79				
0.40	82.29	82.26	82.20	82.25	1.25	0.25	0.56	0.63
0.24	75.03	75.16	75.00	75.06	1.14	0.14	0.55	0.58
0.16	71.60	71.69	71.78	71.69	1.09	0.09	0.54	0.56
0.08	68.72	68.76	68.68	68.72	1.05	0.05	0.55	0.56

Table A.1.30 Viscosity Measurement of 1.0 % photosensitizer for 6 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	66.52	66.41	66.57	66.50				
0.40	79.92	79.90	79.82	79.88	1.20	0.20	0.46	0.50
0.24	75.37	75.22	75.35	75.31	1.13	0.13	0.51	0.54
0.16	71.75	71.93	71.72	71.80	1.08	0.08	0.48	0.50
0.08	68.51	68.53	68.63	68.56	1.03	0.03	0.37	0.38

Table A.31 Viscosity Measurement of 1.5 % photosensitizer for 6 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	65.79	65.84	65.95	65.86				
0.32	77.80	77.89	77.77	77.82	1.18	0.18	0.51	0.55
0.19	70.40	70.41	70.33	70.38	1.07	0.07	0.35	0.36
0.13	68.38	68.42	68.52	68.44	1.04	0.04	0.31	0.31
0.06	67.60	67.50	67.43	67.51	1.03	0.03	0.46	0.46

Table A.1.32 Viscosity Measurement of 2.0 % photosensitizer for 6 months at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	66.20	66.34	66.32	66.29				
0.29	72.95	72.92	72.91	72.93	1.10	0.10	0.32	0.34
0.18	69.98	69.92	69.82	69.91	1.05	0.05	0.28	0.28
0.12	68.21	68.36	68.41	68.33	1.03	0.03	0.25	0.26
0.06	67.26	67.33	67.04	67.21	1.01	0.01	0.23	0.23

For irradiation with four fluorescent lamps

Table A.1.33 Viscosity Measurement of 0 % photosensitizer for 6 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	65.66	65.62	65.78	65.69				
0.40	101.75	101.59	101.65	101.66	1.55	0.55	1.38	1.10
0.24	86.33	86.47	86.47	86.42	1.32	0.32	1.33	1.16
0.16	78.53	78.72	78.59	78.61	1.20	0.20	1.25	1.14
0.08	72.15	72.06	72.12	72.11	1.10	0.10	1.23	1.17

Table A.1.34 Viscosity Measurement of 1.0 % photosensitizer for 6 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	65.69	65.65	65.66	65.67				
0.19	78.62	78.69	78.62	78.64	1.20	0.20	1.02	0.93
0.12	73.34	73.28	73.28	73.30	1.12	0.12	1.02	0.96
0.08	70.84	70.66	70.84	70.78	1.08	0.08	1.02	0.98
0.04	68.66	68.81	68.68	68.72	1.05	0.05	1.27	1.24

Table A.1.35 Viscosity Measurement of 1.5 % photosensitizer for 6 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	65.79	65.84	65.65	65.75				
0.40	85.35	85.24	85.17	85.48	1.30	0.30	0.75	0.66
0.24	77.45	77.46	77.29	77.40	1.18	0.10	0.74	0.68
0.16	73.99	74.00	73.98	73.99	1.13	0.13	0.78	0.74
0.08	69.75	69.89	69.74	69.79	1.06	0.06	0.75	0.73

Table A.1.36 Viscosity Measurement of 2.0 % photosensitizer for 6 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	65.81	65.69	65.87	65.79				
0.39	84.16	84.00	84.19	84.12	1.28	0.28	0.63	0.56
0.24	76.03	76.16	76.00	76.06	1.16	0.16	0.60	0.56
0.15	72.60	72.69	72.78	72.69	1.10	0.10	0.56	0.54
0.06	69.12	69.06	68.94	69.04	1.05	0.05	0.56	0.55

Table A.1.37 Viscosity Measurement of 0 % photosensitizer for 15 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	65.77	65.84	65.65	65.75				
0.40	102.23	102.20	102.21	102.21	1.55	0.55	1.38	1.10
0.24	87.41	87.33	87.21	87.32	1.33	0.33	1.38	1.19
0.16	79.60	79.64	79.63	79.62	1.21	0.21	1.31	1.19
0.08	72.21	72.23	72.23	72.22	1.10	0.10	1.24	1.18

Table A.1.38 Viscosity Measurement of 1.0 % photosensitizer for 15 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	65.78	65.65	65.71	65.71				
0.38	78.43	78.25	78.44	78.37	1.19	0.19	0.50	0.46
0.23	73.66	73.53	73.63	73.61	1.12	0.12	0.53	0.50
0.15	71.07	70.87	70.91	70.95	1.08	0.54	0.53	1.19
0.08	58.28	68.32	68.34	68.31	1.04	0.04	0.53	0.52

Table A.1.39 Viscosity Measurement of 1.5 % photosensitizer for 15 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	65.88	65.82	65.76	65.82				
0.40	79.14	79.29	79.24	79.22	1.20	0.20	0.49	0.45
0.24	73.71	73.66	73.77	73.71	1.12	0.12	0.49	0.46
0.16	71.32	71.17	71.34	71.28	1.08	0.08	0.49	0.48
0.08	68.41	68.43	68.56	68.47	1.04	0.04	0.49	0.48

Table A.1.40 Viscosity Measurement of 2.0 % photosensitizer for 15 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	65.85	66.00	65.95	65.93				
0.40	80.69	80.70	80.64	80.68	1.22	0.22	0.51	0.47
0.24	74.41	74.35	74.34	74.37	1.13	0.13	0.49	0.47
0.16	71.50	71.55	71.46	71.50	1.08	0.08	0.47	0.47
0.08	69.11	68.97	69.00	69.02	1.04	0.04	0.50	0.49

Table A.1.41 Viscosity Measurement of 0 % photosensitizer for 24 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	66.07	66.20	66.10	66.12				
0.40	97.13	96.95	96.98	97.02	1.47	0.47	1.18	0.96
0.24	83.28	83.41	83.24	83.31	1.26	0.26	1.09	0.97
0.16	77.58	77.60	77.46	77.55	1.17	0.17	1.08	0.99
0.08	71.15	71.22	71.10	71.16	1.07	0.07	0.88	0.85

Table A.1.42 Viscosity Measurement of 1.0 % photosensitizer for 24 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	65.94	65.76	65.74	65.81				
0.40	80.07	80.03	80.16	80.09	1.22	0.22	0.51	0.46
0.24	74.37	74.42	74.35	74.38	1.13	0.13	0.50	0.47
0.16	71.04	71.22	71.10	71.12	1.08	0.08	0.46	0.45
0.08	68.58	68.46	68.39	68.48	1.04	0.04	0.47	0.46

Table A.1.43 Viscosity Measurement of 1.5 % photosensitizer for 24 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	65.94	65.76	65.74	65.81				
0.38	76.50	76.42	76.54	76.49	1.16	0.16	0.42	0.40
0.23	72.28	72.36	72.45	72.36	1.10	0.10	0.44	0.42
0.15	70.17	70.13	70.15	70.15	1.07	0.07	0.46	0.42
0.08	67.98	68.12	68.12	68.07	1.03	0.03	0.40	0.39

Table A.1.44 Viscosity Measurement of 2.0 % photosensitizer for 24 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{c}$	$\frac{\ln \eta_r}{c}$
Solvent	66.47	66.48	66.44	66.46				
0.33	75.92	75.82	75.89	75.88	1.14	0.14	0.42	0.40
0.20	71.42	71.46	71.51	71.46	1.08	0.08	0.41	0.37
0.13	69.57	69.60	69.68	69.62	1.05	0.05	0.38	0.36
0.07	67.81	67.75	67.65	67.74	1.02	0.02	0.30	0.29

Table A.1.45 Viscosity Measurement of 0 % photosensitizer for 33 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	66.07	66.20	66.10	66.12				
0.40	93.95	93.92	94.08	93.98	1.42	0.42	1.05	0.88
0.24	81.76	81.72	81.77	81.75	1.23	0.23	0.96	0.87
0.16	76.07	76.18	76.06	76.10	1.15	0.15	0.94	0.87
0.08	71.10	71.15	71.09	71.11	1.07	0.07	0.82	0.85

Table A.1.46 Viscosity Measurement of 1.0 % photosensitizer for 33 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	66.03	65.86	65.86	65.92				
0.29	74.21	74.08	74.16	74.15	1.129	0.12	0.42	0.40
0.17	71.18	71.11	71.14	71.14	1.08	0.08	0.47	0.45
0.11	69.31	69.24	69190	69.25	1.05	0.05	0.44	0.43
0.06	67.77	67.60	67.65	67.67	1.03	0.33	0.52	0.52

Table A.1.47 Viscosity Measurement of 1.5 % photosensitizer for 33 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	65.94	65.76	65.74	65.92				
0.34	79.32	75.32	75.29	75.30	1.14	0.14	0.41	0.38
0.21	71.42	71.36	71.41	71.46	1.08	0.08	0.39	0.38
0.14	69.71	69.63	69.76	69.76	1.06	0.06	0.44	0.43
0.07	67.74	67.74	67.82	67.77	1.03	0.03	0.44	0.43

Table A.1.48 Viscosity Measurement of 2.0 % photosensitizer for 33 days at 135°C

Concentration ($g.dl^{-1}$)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	$\frac{\eta_{sp}}{C}$	$\frac{\ln \eta_r}{C}$
Solvent	66.03	65.86	65.86	65.92				
0.30	73.38	73.31	73.26	73.32	1.11	0.11	0.37	0.35
0.18	70.76	70.78	70.78	70.77	1.07	0.07	0.39	0.38
0.12	68.72	68.90	68.84	68.82	1.04	0.04	0.34	0.33
0.06	67.34	67.35	67.52	67.40	1.02	0.02	0.34	0.33

Table A 2.20 Internal standard peak of outdoor exposure sheets

Photosensitizer Content (%) / Exposure Time	Peak at. 2019 cm^{-1}			
	0	1.0	1.5	2.0
Original	0.2993	0.3956	0.2638	0.3362
15 days	0.3230	0.2796	0.2278	0.2757
1 month	0.2779	0.2987	0.3001	0.2538
2 months	0.2937	0.2641	0.2553	0.2436
3 months	0.2403	0.2283	0.2425	0.2303
4 months	0.3057	0.2250	0.2748	0.2404
5 months	0.2643	0.2530	0.2105	0.2182
6 months	0.2341	0.2393	0.2484	0.2311

Table A 2.21 Internal standard peak of HDPE sheets irradiated with four fluorescent lamps

Photosensitizer Content (%) / Exposure Time(days)	Peak at 2019 cm^{-1}			
	0	1.0	1.5	2.0
Original	0.2993	0.3956	0.2638	0.3362
6	0.3307	0.3033	0.2910	0.2474
15	0.3116	0.2397	0.2403	0.2497
24	0.3076	0.3203	0.2421	0.2653
33	0.3054	0.2884	0.2588	0.2490

Table A 2.22 Internal standard peak of HDPE sheets irradiated with HPK 125 W

Photosensitizer Content (%) / Irradiation Time(days)	Peak at 2019 cm^{-1}	
	Ø	1.5
Original	Ø.2993	Ø.2638
48	Ø.2620	Ø.2237
96	Ø.3174	Ø.2447
144	Ø.2910	Ø.2159
192	Ø.2817	Ø.2946
240	Ø.2716	Ø.2896

APPENDIX B

SAMPLE CALCULATION

1. Calculation of tensile strength ISO 1184

Calculation of the tensile strength on the basis of the original cross-sectional area of the test sample uses equation

$$\sigma = F / A$$

where

σ is the tensile strength in kilograms per square millimeters.

F is the force in kilograms.

A is the initial cross-sectional area in square millimeters of the test sample.

2. Calculation of elongation ISO 1184

Calculation of the percentage elongation on the basis of the original gauge length uses formula

$$(l - l_o) / l_o \times 100$$

where

l is the distance in millimeters between the guage marks.

l_o is the original guage length in millimeters.

3. Calculation of intrinsic viscosity ASTM D1601

3.1 Relative viscosity (viscosity ratio)

Calculation of the relative viscosity for each concentration is measured from the average efflux time as follows

$$\eta_r = t/t_o$$

where

η_r = relative viscosity (viscosity ratio)

t = average efflux time of solution

t_o = average efflux time of pure solvent

3.2 Intrinsic viscosity (logarithmic viscosity number)

Calculation of the inherent viscosity for each concentration is measured as follows

$$\eta_{inh} = (\ln \eta_r)/C$$

where

η_{inh} = inherent viscosity at concentration C

$\ln \eta_r$ = natural logarithm of the relative viscosity

C = concentration in grams/ml of solution

3.3 Specific viscosity

$$\eta_{sp} = \eta_r - 1$$

where

η_{sp} = specific viscosity

3.4 Reduced viscosity

$$\eta_{red} = \eta_{sp} / C$$

where

η_{red} = reduced viscosity

3.5 Intrinsic viscosity

The four logarithmic viscosity numbers are plotted versus their respective concentrations on rectilinear graph paper and then the four reduced viscosity numbers are plotted versus their respective concentrations on the same graph. The slopes of these two lines will not be the same , but they converge to the same value at zero concentration. The intrinsic viscosity ,[n], is the intercept of the line at zero concentration.

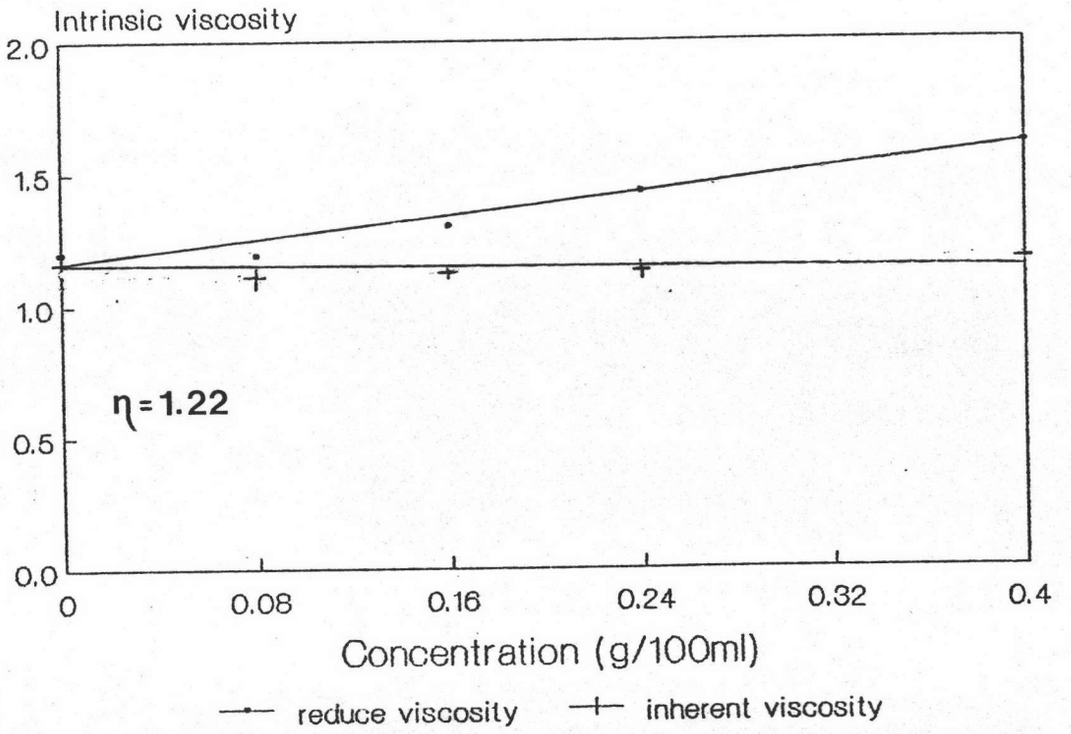

Figure B.1 Intrinsic viscosity of 0 % photosensitizer for original sample.

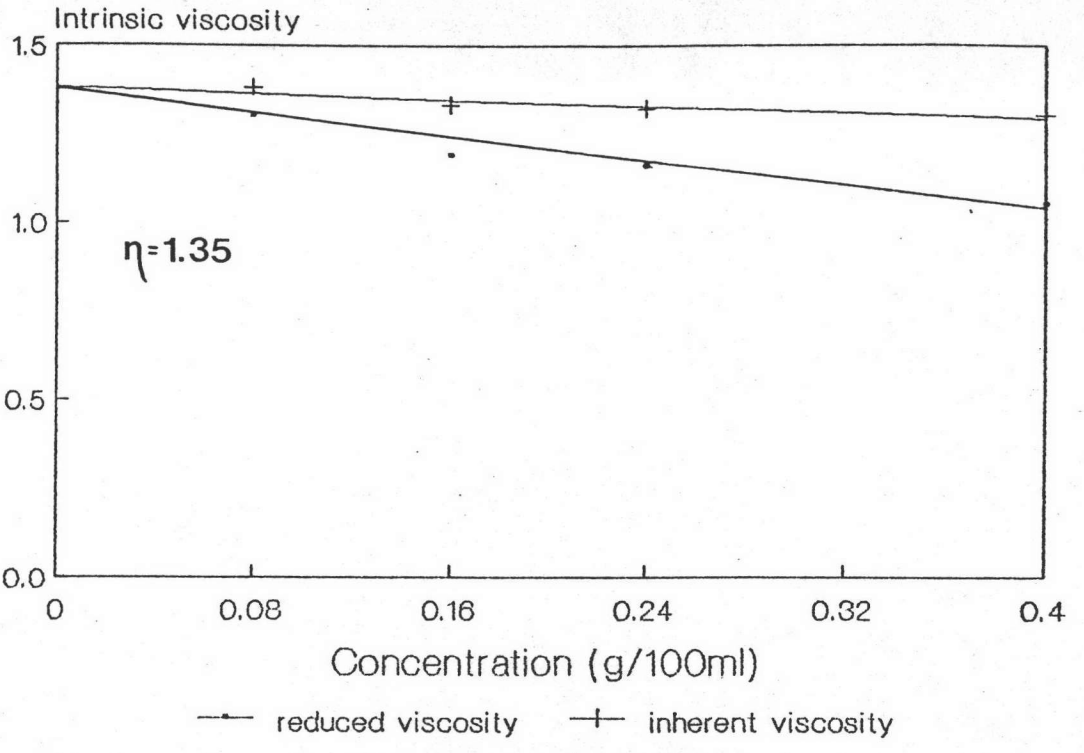

Figure B.2 Intrinsic viscosity of 1.0 % photosensitizers for original sample

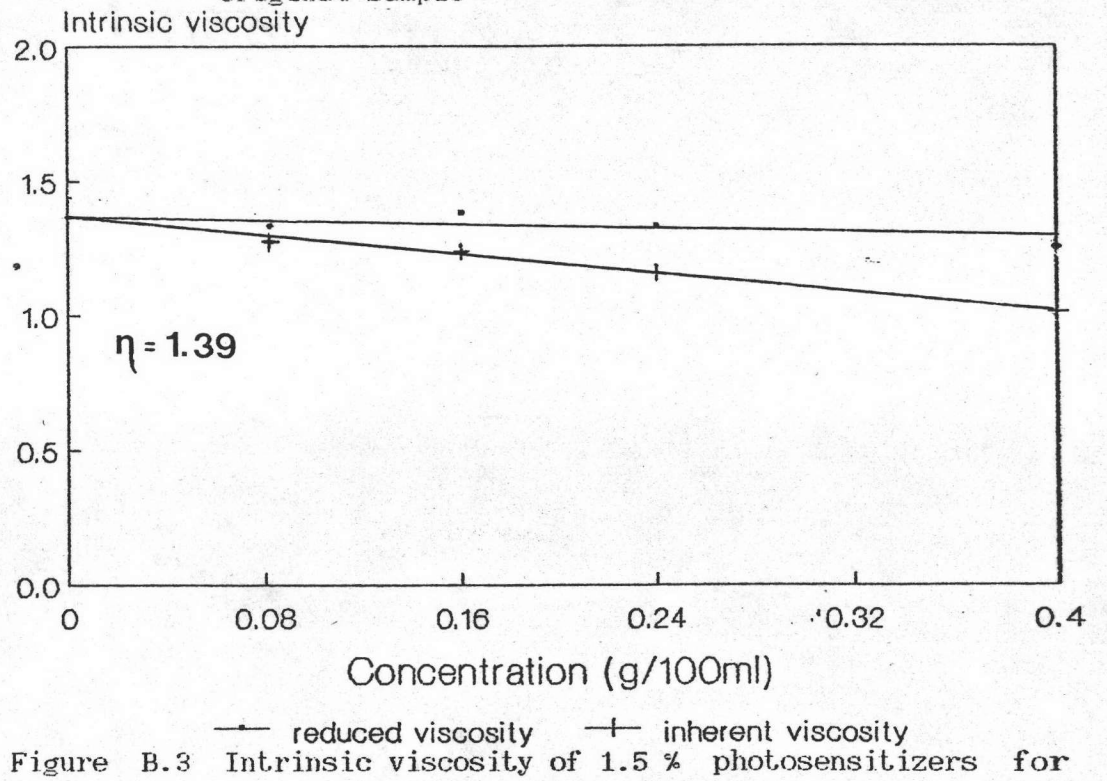

Figure B.3 Intrinsic viscosity of 1.5 % photosensitizers for original sample.

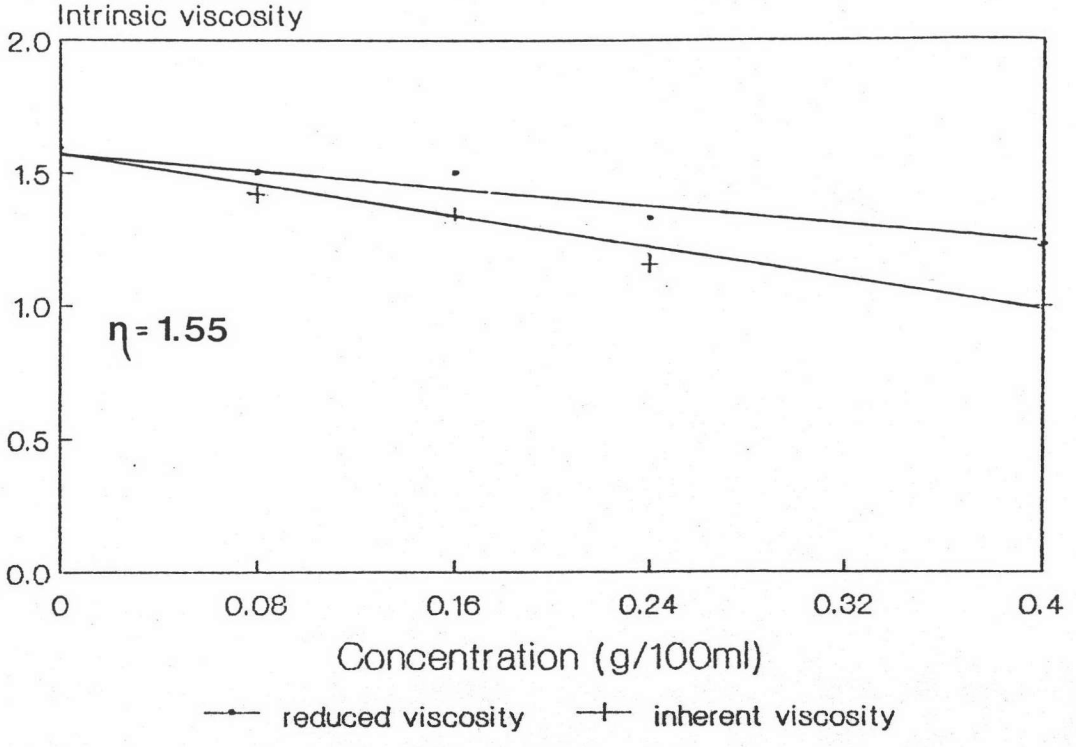

Figure B.4 Intrinsic viscosity of 2.0 % photosensitizers for original sample

APPENDIX C

METEOROLOGICAL DATA

Month 1989	Radiation $T.10^2$ MJ/M^2	Temp. ° c	R.H. %	Rainfall mm
Jan.	1655	28	75	29.2
Feb.	1883	28.1	76	0.9
Mar.	2247	28.8	74	82.0
Apr.	2511	31.5	68	2.4
May	1991	30.1	72	178.2
June	1959	29.1	71	86.5
July	1910	29.2	73	176.8
Aug.	1916	29.1	73	181.1
Sep.	1726	28.7	78	410.1
Oct.	1702	28.2	80	315.5
Nov.	1911	27.7	70	33.7
Dec.	1856	25.6	65	0.0
Annual	1938.92	28.7	73	1496.4

- From " The Monthly Report of the Climatology Divison , Meteorological Department

VITA

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