SUPPORTING INFORMATION RSC ADVANCES
"Light Polarization Plastic Visualizer: Light Distribution and Anisotropy"
of A. Shalit et al.

Experimental

Materials:

The materials used in this work are the following: di-penta-erythritol-penta/hexa-acrylate (DPHPHA), 1,4,7-trimethyl-3,6-dioxaoctane-1,8-diol-di-acrylate (TPGDA), mono-(methyl-metha)-acrylate (MMA), 1-chloro-hexane (Cl-Hex), 1-bromo-hexane (Br-Hex), 1-bromo-butane (Br-But), 1-chloro-butane (Cl-But), (1R,4S)-1,7,7-trimethylbicyclo[2.2.1]heptane-2,3-dione (camphorequinone, identified in the text with the acronym CQ) were purchased from SIGMA-Aldrich and used as received without further purification.

- *Refractive indexes of the halo-alkanes* (at 589 nm, 20 °C, reported as given by Sigma-Aldrich) used in this work are the following: Br-But=1.439, Br-Hex = 1.448; Cl-But = 1.402, Cl-Hex = 1.419

- ***Typical LPV mixture composition***: Multiacrylate (67%) + Photoinitiator (6%) + Haloalkane (27%).

Methods:

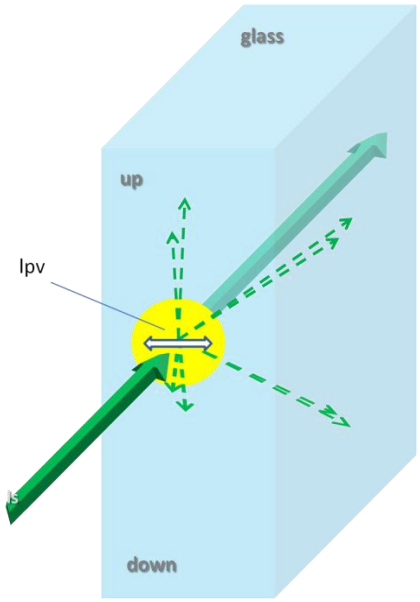
Mixture Preparation: LPV mixture is prepared as follows [18]: in a small bottle, the monomer (700 mg) is added to CQ (8.5 % w/w; 60 mg). The mixture so prepared remains under magnetic stirring for several days in darkness, at room temperature, until a yellow, homogenous mixture is obtained. After that the mixture is ready to be sandwiched between a 175 μm glass and the narrowest (15 mm) side of a 200 mm x 100 mm x 15 mm glass (Scheme 1).

Instruments used: Laser source Empower-30 (Intracavity-Doubled, Diode-Pumped nd : YLF Laser), Spectra-Physics Nano-second pulsed laser, $\lambda = 532$ nm.

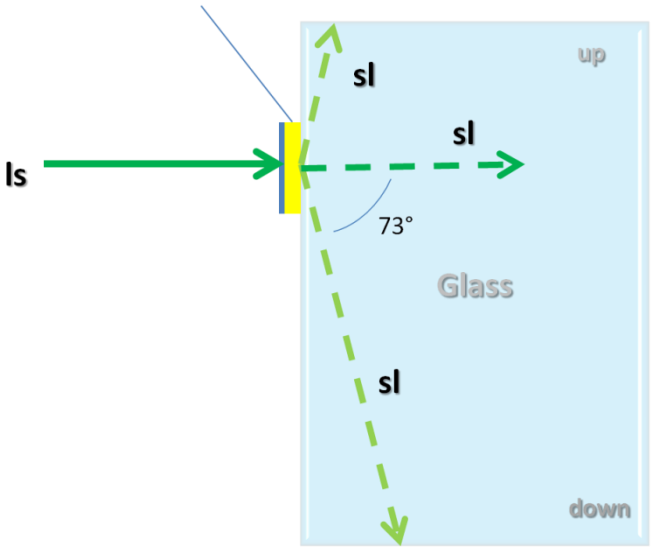
Irradiation parameters: time = 15 minutes; intensity = 2 W/cm^2

Scheme 1

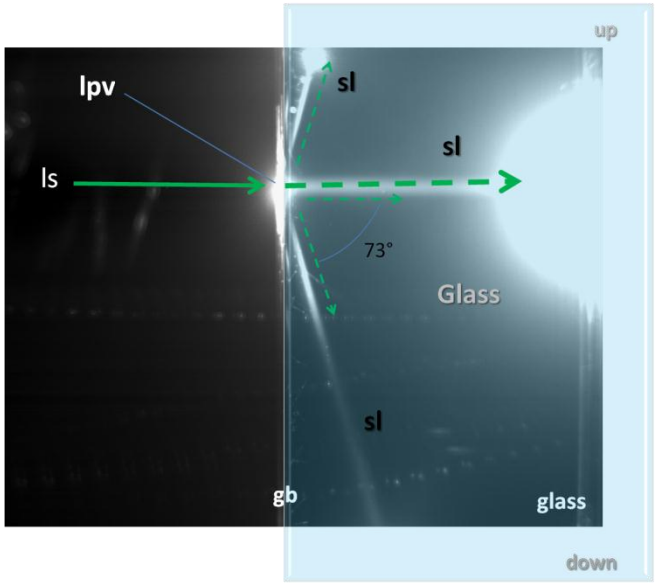
(a) Perspective



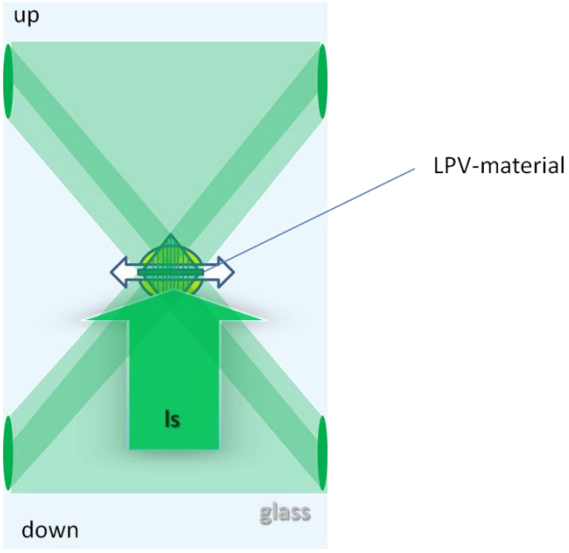
(b) Lateral



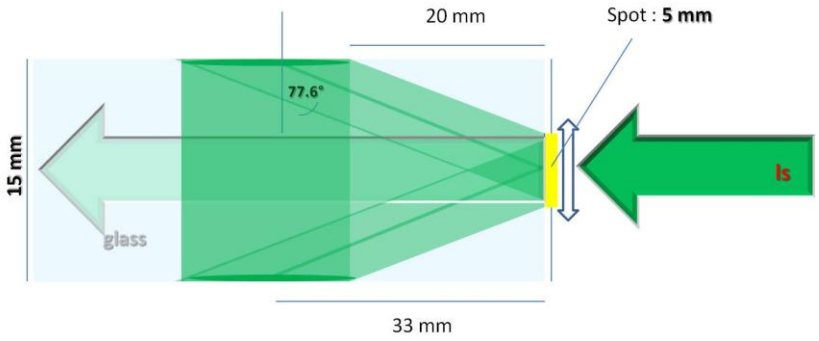
(c) Merging of the Figure 1a and the (a) "Lateral" to show the set-up.



(d) Orthogonal projection (frontal view)



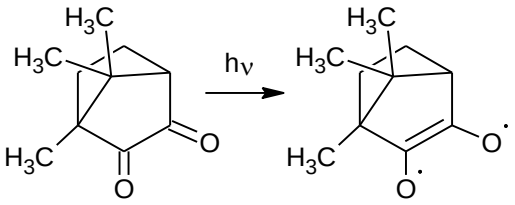
(e) Orthogonal projection (view from above)



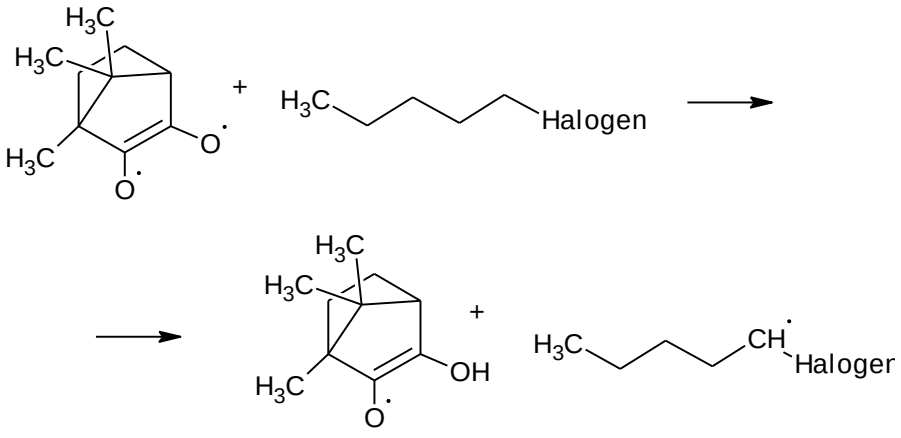
Scheme 1: ls = Laser source; sl = scattered light; gb = glass border. Green continuous arrow: laser-light in entrance; the white (blue-limited) double arrow indicates the polarization vector of the incident laser light. The scattered light is indicated by green dashed type arrows; in yellow is indicated the area where the lpv mixture is placed. In (b) "lateral", the polarization is along Z, perpendicular to the plane of the picture.

Scheme 2:

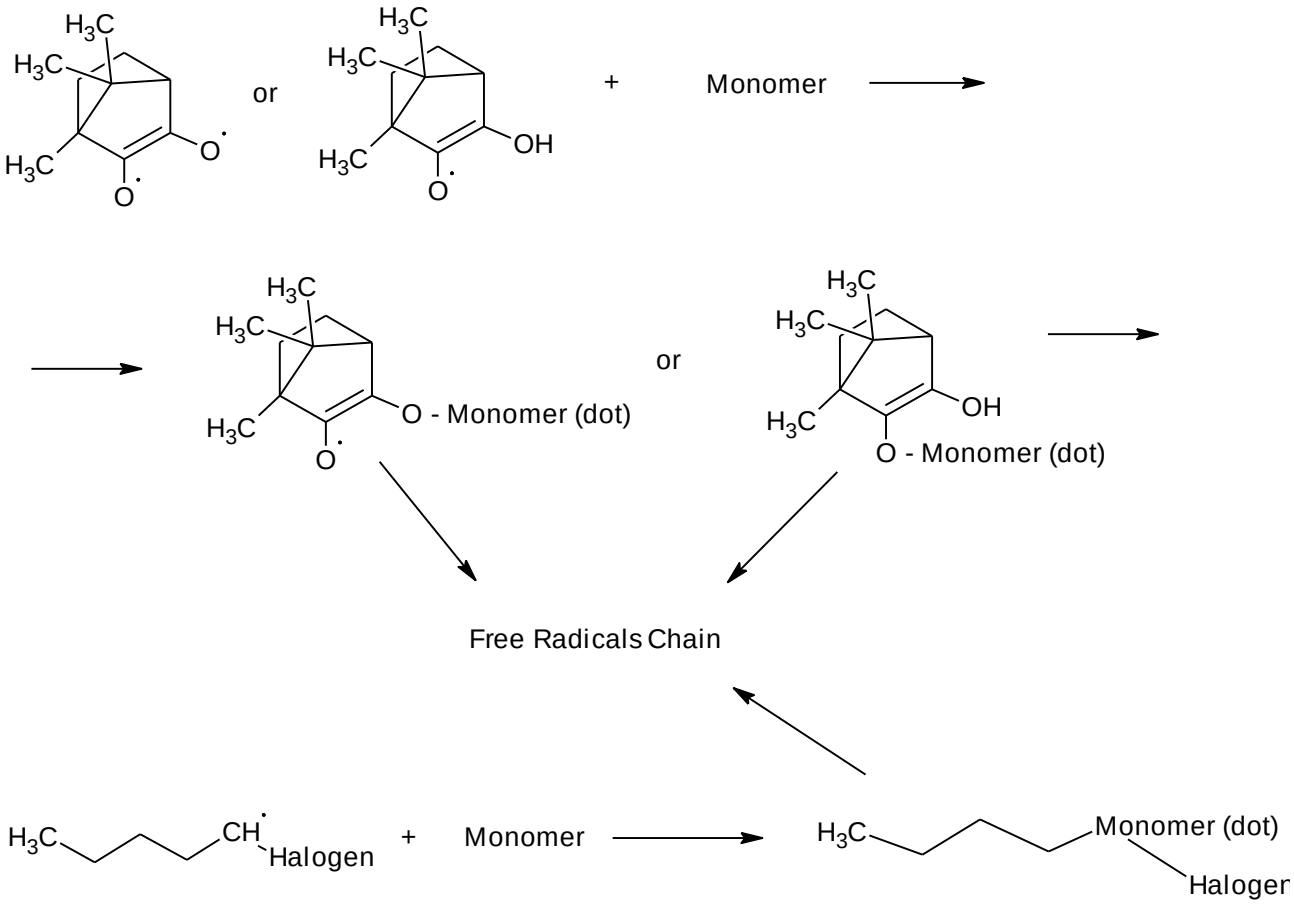
a)



b)



c)



Scheme 2: probable working free radicals mechanisms in LPV systems; Halogen = Cl, Br.

Figure S1

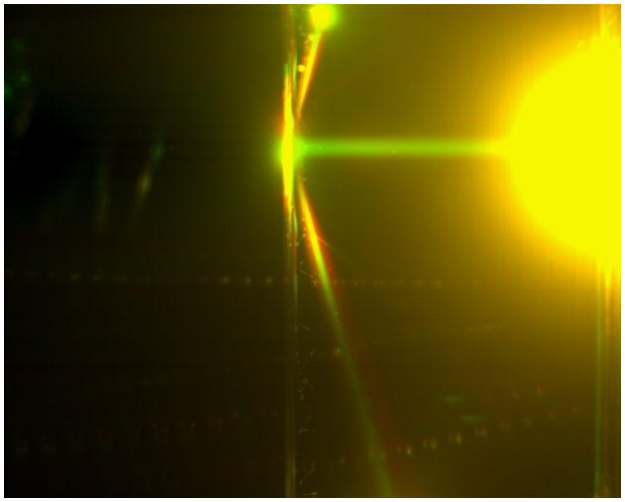


Figure S1: Merging of Figs. 1a (green) and 1b (red). The yellow color identifies the regions where the picture 1a and 1b perfectly coincide.

Figure S2

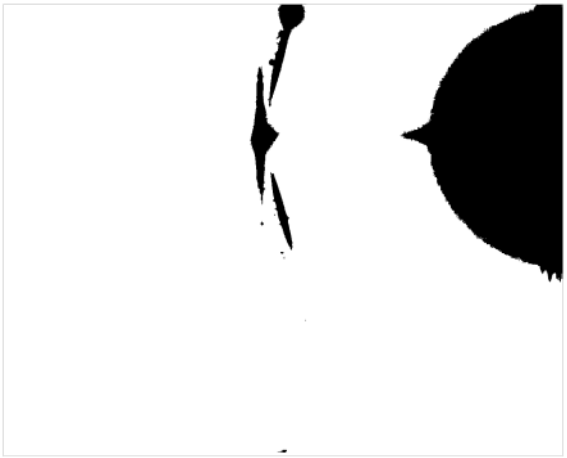


Figure S2: maxima of light intensity of HFLPV from picture of Figure 1a). The black parts of the picture represent the maxima intensity obtained with Image J program, from Fig. 1a). In this latter figure is deducible the angle of light sent towards the larger area size (200 mm x 100 mm) of the biggest glass used to sandwich the LPV material. The angle is higher than 42° - minimum angle required in order to justify a phenomenon of Total Internal Reflection at the border glass-air.