Supporting information for "Monitoring the photocrosslinking kinetics of gelatin methacryloyl using in situ photorheology" by CD O'Connell et. al.

1. Measurement of I2959 molar extinction coefficient in DPBS

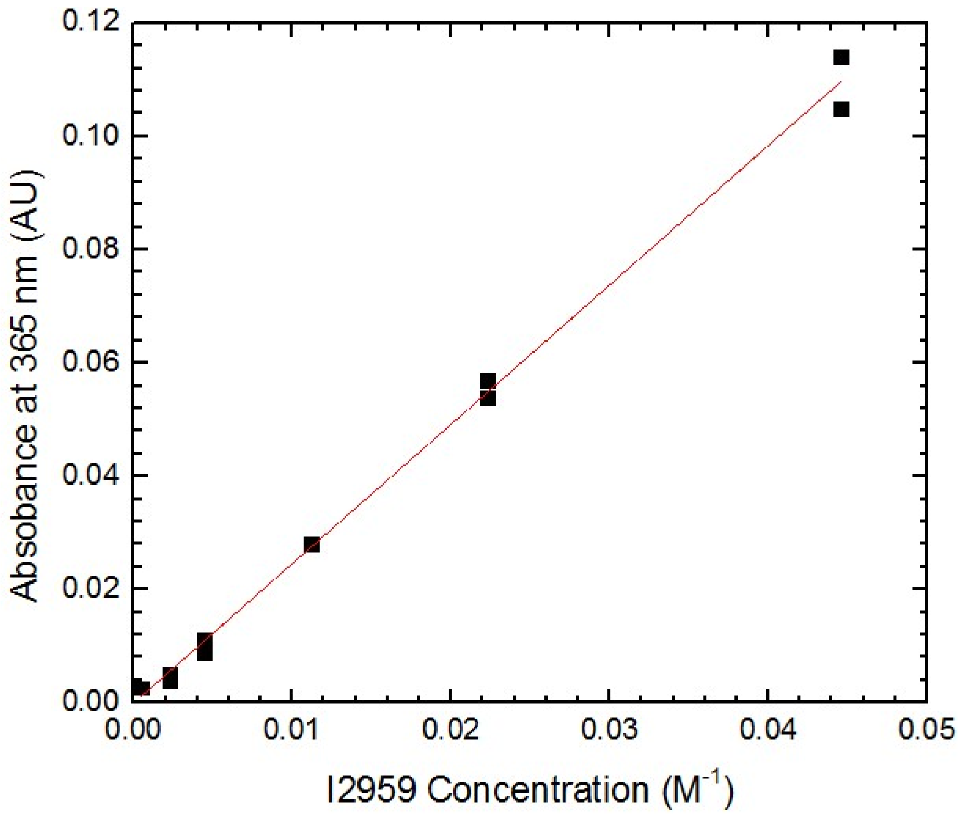

Figure S1: Absorption of 365 nm light as a function of I2959 concentration. Molar extinction coefficient was measured at 2.46 +/- 0.035 M^{-1})(R^2=0.0998)

2. Photo-initiator degradation model

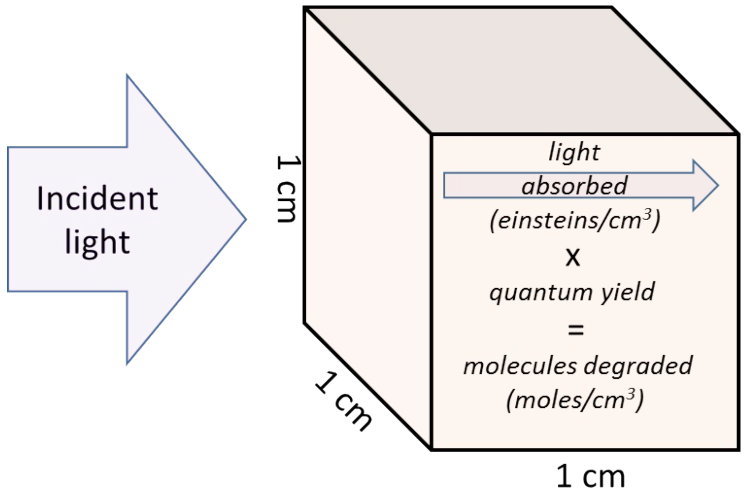

Figure S2: photo-initiator degradation is modelled for light exposed on a 1 cm cube (mimicking the geometry of a UV-vis cuvette). Incident light intensity (in einsteins s^{-1} cm^{-2}) x fraction of light absorbed x quantum yield = degradation rate of photo-initiator (in moles s^{-1}).

3. Justification of rheological measurements as a proxy for hydrogel crosslinking

According to the theory of polymer elasticity the elastic modulus (*E*) of a rubber-like material is directly proportional to the crosslink density, V_c.[1]

$$E = (3\rho RT)/M_c = (3\rho RT)V_c \tag{6}$$

where, *R* is the gas constant, *T* is absolute temperature, ρ is polymer density, and M_c is the average molecular weight between crosslinks. For hydrogels this expression often contains a constant pre-factor denoting dilution of the network. Meanwhile the elastic modulus is related to the shear modulus (G) by:

$$E = 2G(1 + v) \tag{7}$$

where *v* is Poisson's ratio (typically 0.5 for most materials). The shear modulus is thus linear with respect to crosslink density, according to:

$$G = \rho RTV_c \tag{8}$$

Thus, the increase in shear modulus is directly related to the rate of crosslinking.

4. **Estimated decrease in I2959 concentration with time at a range of light intensities.**

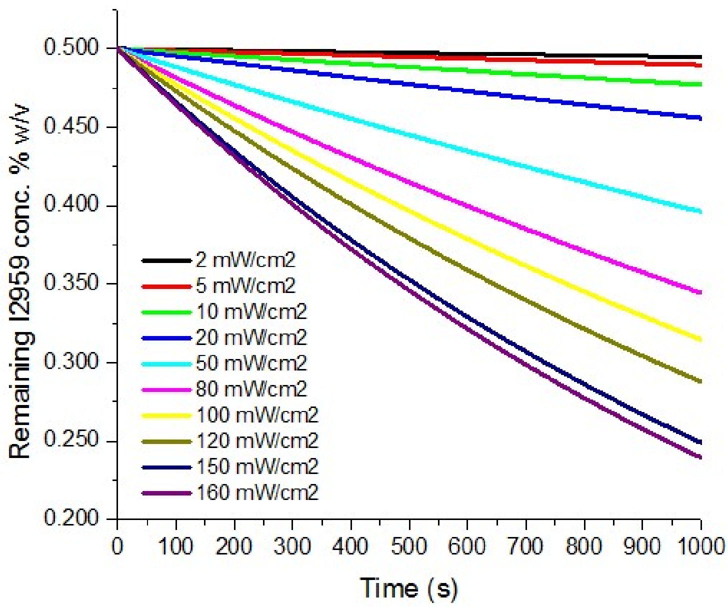

Figure S3: Calculated I2959 concentration as a function of time at a range of light intensities. Most GelMa experiments were completed within 200s, during which time the GelMa concentration does not decrease by more than 10%, even for high intensities.