Supplementary information for: Oxygen-Purged Microfluidic Device to Enhance Cell Viability in Photopolymerized PEG Hydrogel Microparticles

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Table 1. PEGDA polymerization reaction steps

Steps #	Reaction	Description
1	$I \xrightarrow{k_d} R^*$	Initiator photolysis
2	$R^* + M \xrightarrow{k_i} M^*$	Monomer activation
3	$M_n{}^* + M \xrightarrow{k_p} M_{n+1}{}^*$	Chain propagation
4	$M_n{}^* + M_m{}^* \xrightarrow{k_t} M_{n+m}$	Chain termination
5	$M_n{}^* + O_2 \xrightarrow{k_{O_2}} MOO$	Oxygen inhibition
6	$M_n{}^* + O_2 \xrightarrow{k_{O_2}} MOO$	Radical oxidation

In the above table, M represents unconverted double bonds; M* represents the radical species; X represents all the radical species (M* and R*).

Table 2. Parameters involved in modeling predicted peroxy radical accumulation

Parameter	Description	Value	Reference
r	radius of the droplets	25 μm	[1]
D_{O2}	oxygen diffusivity in the droplet	$1*10^{-10}$ m^2/s	[2]
D_I	Photoinitiator diffusivity in the droplet	$1*10^{-18}$ m^2/s	[3]
k_{O2}	Rate constant of the radical	$5*10^5$ $m^3*mol^{-1}*s^{-1}$	[4]

	oxidation		
k_p	Rate constant of polymer propagation	25 $m^3*mol^{-1}*s^{-1}$	[1]
k_t	Rate constant of radical termination	$2.5*10^3$ $m^3*mol^{-1}*s^{-1}$	[1]
φ	Quantum yield of radical	1.0	[5]
λ	Wavelength	365 nm	
N_A	Avogadro number	mol^{-1}	
h	Planck's constant	$6.63*10^{-34}$ $m^2*kg^{-1}*s^{-1}$	
C	Speed of light	$2.99*10^8$ $m*s^{-1}$	
ε	Molar absorptivity	$2.18*10^5$ cm^2*mol^{-1}	[5]
I_0	UV light intesnity	220 $mW*cm^{-2}$	
MW_{PEGDA}	Molecular weight of PEGDA	$3.4*10^3$ $g*mol^{-1}$	

References

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