Supporting Information for

Elimination of Unreacted Acrylate Double Bonds in the Polymer Networks of Microparticles Synthesized via Flow Lithography

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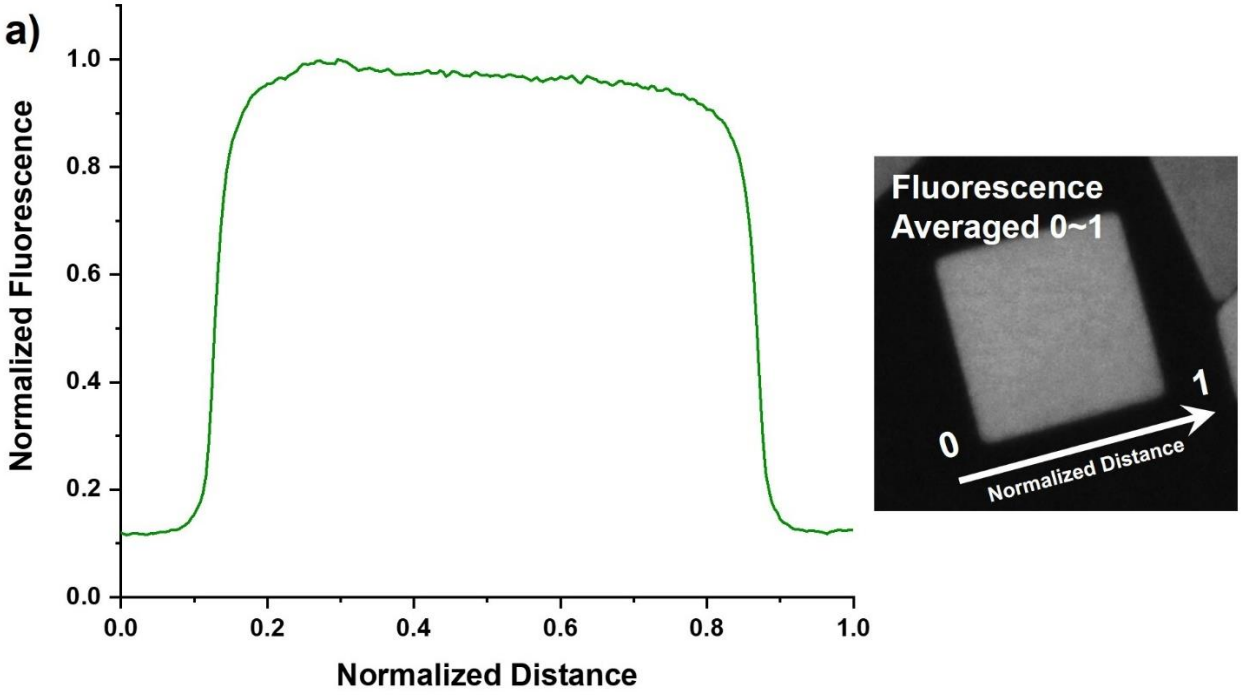
1. Evaluation of UADB distribution within hydrogel microparticles

We evaluated the feasibility of tethering FITC-PEG-SH molecules to UADBs. Uniform UADB density was expected because the physicochemical environment inside the thin (~10 μm) microchannels would be homogeneous (e.g., free radical density, cross-linking density). Fluorescence images of FITC-PEG-labeled particles were taken, and their fluorescence intensity profiles were calculated by the imageJ program (NIH, USA) equipped with plug-ins (radial profile angle; NIH, USA), and in-house made macro. The fluorescence signal was measured throughout the particle to get an averaged signal, and background signals were measured simultaneously to discriminate the fluorescence cut-off lines. We evaluated fluorescence intensity profiles of the particles synthesized in different UV conditions. Particles shown in fig. S1b were shape-coded to distinguish different types.



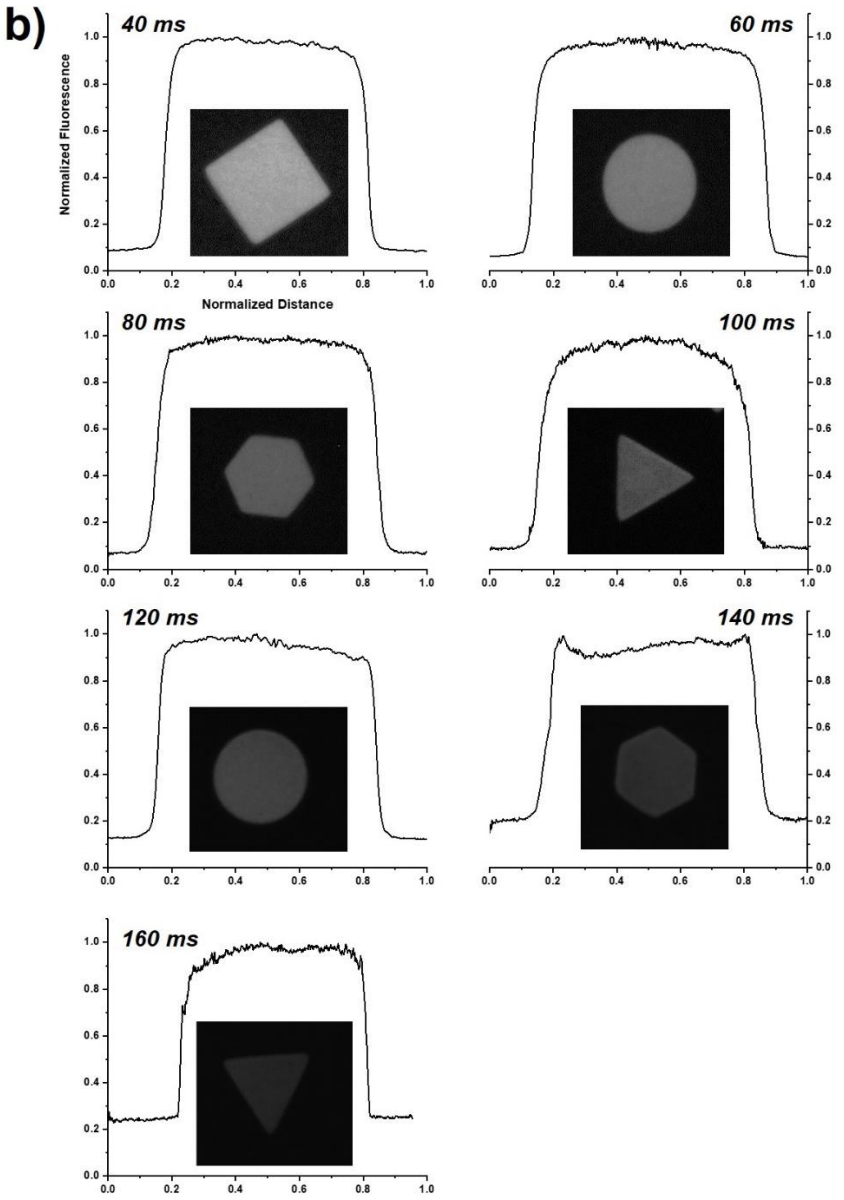


Fig. S1. Fluorescence intensity profiles of a) the particles shown in Fig. 2b (upper right, 96 hr), and b) the particles fabricated under UV energy of 1,100 mW/cm^2, but different exposure time (40~160 ms).

2. Determination of UV irradiation conditions

We investigated proper UV conditions, such as energy density and exposure time based on morphology of the particles. The amount of UV energy should be large enough to make solid particles. Fig. S1 (left) represents particles having insufficient mechanical strength when synthesized under low UV energy. These particles showed shape change during rinsing steps (i.e., shearing and centrifugation). On the other hand, with too much UV energy, particles would form either blurred shape or over-polymerization layers. Given that flow lithography (FL) uses stopped-flow during UV exposure, long-time exposure would lead to formation of blurred particle because of slow motion of precursor due to its inertia. Additionally, too high UV energy density would cause over-polymerization that might make particles stick on the top and the bottom of the micro-channel.

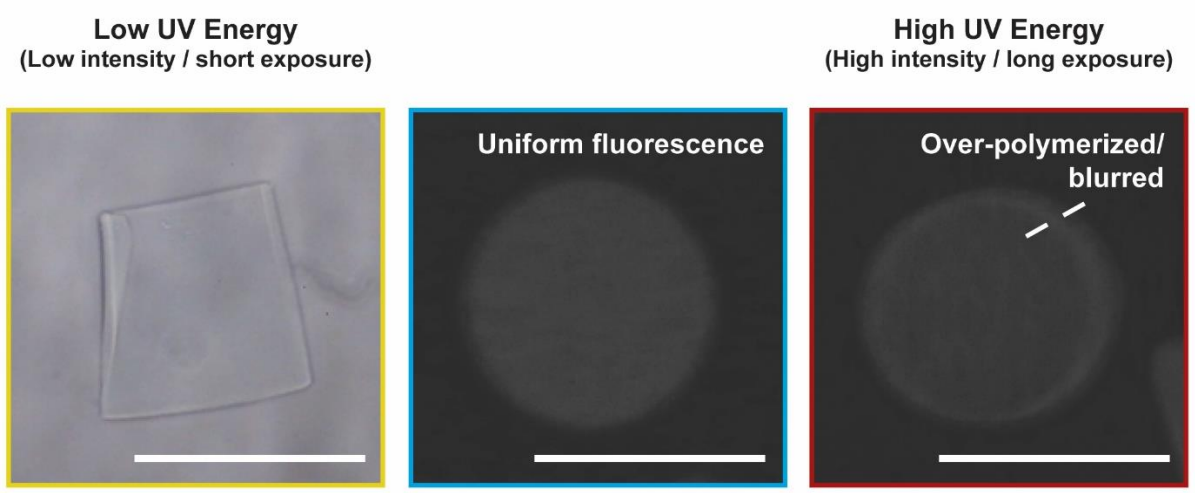


Fig. S2. Selection of UV conditions depending on morphology of particles (scale bars are 100 μm).

3. Characterization of cell survival rates in presence of microparticles with or without UADBs

We characterized real-time cell survival rates under different cell:particle ratios and particle types (UADB-remaining or UADB-blocked) based on the following procedures. 1) 5×10^4 cells (MDB-MB-231) were incubated with UADB-remaining or -blocked particles for 2 h while being monitored at 10 min intervals using Live Cell Imaging System (DMI6000B, Leica Microsystems, Germany) and the LAS X software (ver. 1,1,12420,0, Leica). Fig. S3 shows the live cell images under control (DPBS), particles (UCDB-remaining; w/o blocking and UCDB-blocked; w/ blocking).

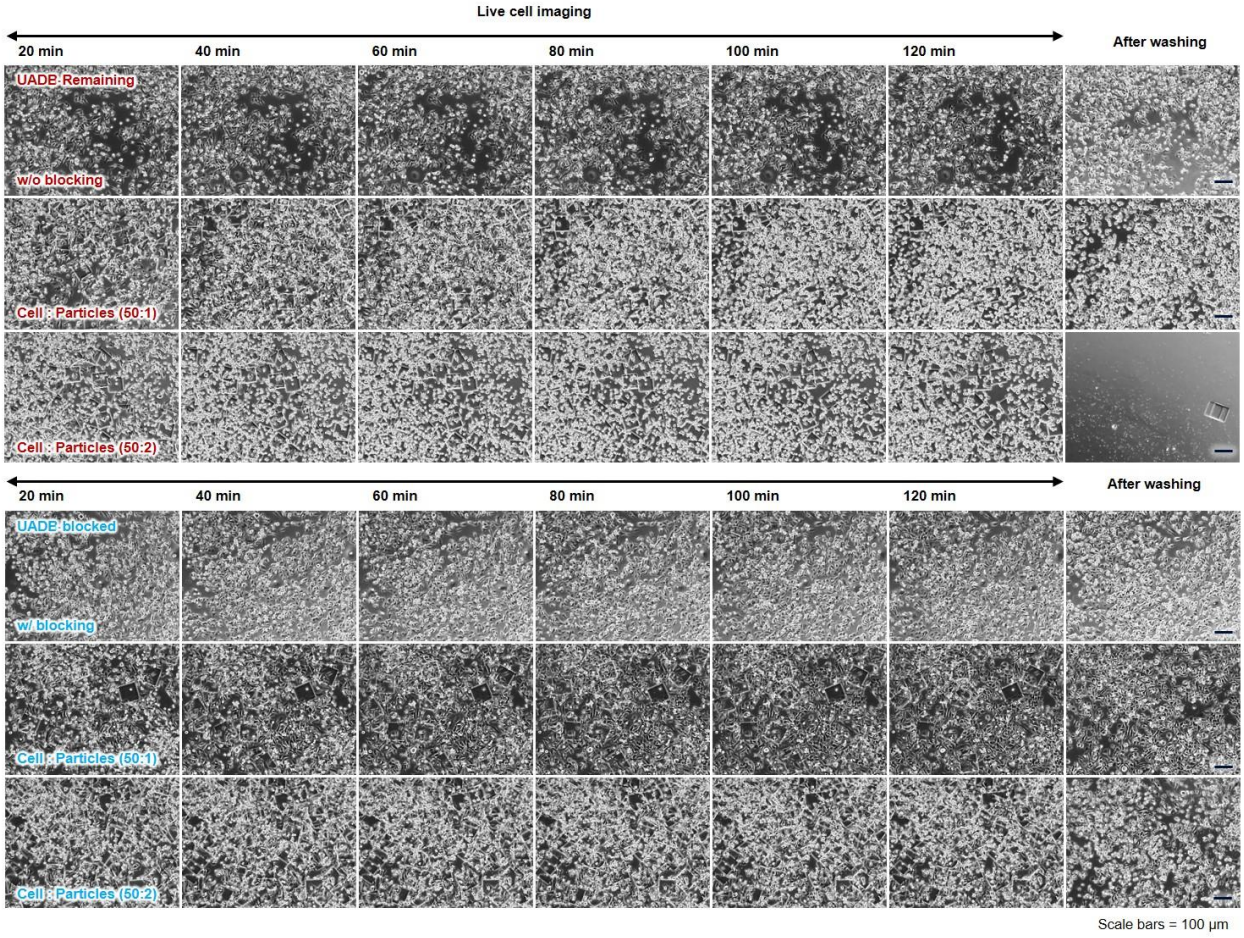


Fig. S3. Real-time live cell images of MDA-MB-231 cells incubated with UADBs-remaining or -blocked particles. Scale bars are 100 μm.