Unreacted Double Ends Remained in the Polymer Networks by Flow Lithography

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Flow Lithography (FL) has been an effective technique to synthesize anisotropic multifunctional hydrogel microparticles for various applications such as diagnostics, photonics, and drug delivery. Unfortunately, when the particles are synthesized by crosslinking of oligomers in the precursor, the free-radical polymer network contains considerable carbon double ends. These end groups could result problems such as inhibiting the functionalities or bio-availability because they are chemically reactive and bio-toxic. We verified the existence of these double ends by thiol-ene click chemistry and also quantified the amount of them by changing conditions, such as UV intensity and exposure time. We present a simple method to eliminate them to solve the potential problems by linking PEG-SH to double ends via click reactions. The PEG-SH treated particles show much better biocompatibility, validated by the much higher cell viability compared with untreated ones.