

Low Temperature Flow Lithography

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Flow Lithography(FL), a microfluidic technique that synthesizes hydrogel particles via photolithography, has been gaining popularity for its ability to assign complex geometrical and chemical designs to microparticles. Particles produced using this technique function in a broad range of applications, including bioassays, drug delivery, and tissue engineering. For such particles, which are formed by free radical polymerization, their structural quality and performance are closely related to the degree of polymerization. Microparticles that exhibit a higher degree of polymerization display a more developed polymer network, resulting in a more defined morphology, higher content of incorporated materials, and improved performance. Here, we introduce low temperature FL that increases the degree of polymerization of microparticles without compromising other aspects of the technique. We demonstrate the increase in the degree of polymerization by examining the temperature effect on both the physical and chemical structures of particles. Low temperature FL offers a simple method of improving the degree of polymerization, which can be implemented in a wide range of FL applications.