

Multilayered polyimide film three-dimensional microreactors for better chemical processes

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In microfluidic systems, the spatial and temporal control of reactants and products offers a novel method for chemical manipulation and product generation. Herein, we present the versatile uses of multilayered polyimide film microreactors with various functions including pressure tolerance, parallelization and three-dimensional mixing. Such polyimide film microreactors were fabricated by a simple one-step thermal bonding technique with high reproducibility. The various unique three-dimensional microreactors were devised by embedding multilayer films and were successfully utilized on the basis of different purposes in high throughput generation of emulsions and nanoparticles, organic-aqueous biphasic interfacial reactions, and submillisecond organic syntheses. This simple stacking and economic polymer film microreactors, which individually fit in one hand, has great potential for various microfluidic applications in chemistry and biology.