Electronic Supporting Information for

Indirect fabrication of versatile 3D microfluidic device by rotating plate combined 3D printing system

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Figure S1. Attenuated Total Reflection (ATR) spectrum for immobilizing Pd catalyst on glass surface. Step 0: Bare glass. Step 1: Hydroxylated surface by treating with Piranha solution, 3,300 cm$^{-1}$ peak for -OH group. Step 2: Amine functionalized surface by treating with APTES (aminopropyltriethoxysilane) to the hydroxylated surface, 2,900 cm$^{-1}$ peak for -NH$_2$ group.
Figure S2. Schemes of model chemical reactions to test the fabricated fluoropolymer-glass microreactor. (a) Suzuki coupling reaction at room temperature in the Pd catalyst immobilized linear microchannel (600 µm wide, 200 mm long). (b) Photochemical C-N coupling reaction at room temperature under a flat LED light source (600 µm wide, 200 mm long).
Figure S3. $^1$H NMR spectrum of 4-phenylbenzonitrile in CDCl$_3$ as a product of Suzuki coupling reaction.
Figure S4. $^1$H-NMR spectrum of (1R,5S,6R,7S)-bicyclo[3.2.0]heptane-6,7-diylibis(phenylmethanone) in CDCl$_3$ as a product of photochemical C-N coupling reaction.
Figure S5. (a) Scheme of asymmetric splitting-merging type of micromixer (width: 600 μm, height: 130 μm, length: two inlets 21.2 mm, larger main line 267.2 mm, and 9 smaller lines 109.3 mm). (b) Scheme of Y-shaped serpentine microchannel (width: 600 μm, height: 100 μm, length: 234.5 mm), a hybrid PDMS-glass microchip was fabricated by conventional soft-lithography technique. (c) UV-Vis absorbance spectrum of n-heptane solution containing different amount of Nile red dye, which was collected from an asymmetric splitting-merging type of micromixer outlet at various flow rates (1: no flow, 2: 40 μL/ml, 3: 80 μL/ml, 4: 120 μL/ml, 5: 160 μL/ml, 6: 200 μL/ml.)
Figure S6. (a) Microscopic image of microchannel (white) in the PTFE membrane-embedded dual-channel microreactor fabricated by SGP process. (Scale bar: 1 mm). Cross-section of PTFE membrane pore: (b) before and (c) after filling by PFPE resin. (d) Illustration of gas-liquid reaction set.