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Solution Exchange Lithography: A Versatile Tool for Sequential Surface Engineering CHRISTIAN PESTER, KAILA MATTSON, DAVID BOTHMAN, Univ of California - Santa Barbara , DANIEL KLINGER, FU Berlin, KENNETH LEE, EMRE DISCEKICI, BENJAPORN NARUPAI, CRAIG HAWKER, Univ of California - Santa Barbara — The covalent attachment of polymers has emerged as a viable strategy for the preparation of multi-functional surfaces. Patterned, surface-grafted polymer brushes provide spatial control over wetting, mechanical, biological or electronic properties, and allow fabrication of 'intelligent' substrates which selectively adapt to their environment. However, the route towards patterned polymer brush surfaces often remains challenging, creating a demand for more efficient and less complicated fabrication strategies. We describe the design and application of a novel experimental setup to combine light-mediated and flow chemistry for the fabrication of hierarchical surface-grafted polymer brushes. Using light-mediated, surface initiated controlled radical polymerization and post-functionalization via well-established, and highly efficient chemistries, polymer brush films of previously unimaginable complexity are now shown to be accessible. This methodology allows full flexibility to exchange both lithographic photomasks and chemical environments in-situ, readily affording multidimensional thin film architectures, all from uniformly functionalized substrates.

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