

## Fabrication of Optofluidic Chips by Merging Photolithography and Holographic Lithography

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In this study, we report a new strategy of integrating holographic lithography with photolithography. It leads to hybrid patterns of the microchannels and 3-dimensional nanostructures which is compatible with a microfluidic platform. This hybrid structure could be applied to the optofluidic platform; the combination of the microfluidics and photonics. Holographically fabricated 3-dimensional structures have photonic band-gap property due to their structural periodicity and microfluidic channels give adaptive controllability of the refractive index. Since the photonic band-gap properties of 3-dimensional nanostructures can be tuned by the refractive index mismatches between two different materials, it can be used as tunable waveguide and optical filters. By same principles, it can detect the chemical and bio-materials from the photonic band-gap shift. Only small amount of sample is needed in these optofluidic devices since the volume of the microfluidic channel is nanoliter scale and the sample species can be detected immediately by optical signals associated with photonic band-gaps.