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In this paper, a thiol-ene based polymer waveguide, defined by UV-assisted soft lithography, is designed, fabricated and characterized. Waveguides are formed by filling microfluidic channels with a high refractive index liquid mixture of ‘thiol’ and ‘ene’ monomers (e.g., trimethylolpropane tris(3-mercaptopropionate) = ‘thiol’, and 1,3,5-triallyl-1,3,5-triazine-2,4,6(1H,3H,5H)-trione = ‘ene’), which can be cured by UV exposure into a solid polymer. The waveguides demonstrated good confinement of light, and a propagation loss of 0.5 dB/cm was obtained. To our best knowledge, this is the first report to employ thiol-ene based polymers as waveguide core materials for potential optofluidic applications.

General information
State: Published
Organisations: ChemLabChip, Department of Micro- and Nanotechnology
Contributors: Zhuang, G., Jensen, T. G., Kutter, J. P.
Publication date: 2011

Host publication information
Title of host publication: Proceedings of 15th International Conference on Miniaturized Systems for Chemistry and Life Sciences
Keywords: Thiol-ene, Polymer waveguide, Optofluidics
Research output: Research - peer-review > Article in proceedings – Annual report year: 2011