

## **Fabrication of Multi-Functional Optical I/O Via Imprint Lithography**

*Sue Ann Bidstrup Allen, Ate He, Paul A. Kohl*

*School of Chemical Engineering, Georgia Tech, Atlanta, GA 30332-0100*

Physical relief features are important for the fabrication of nanometer-scale optical features. In this paper, a new fabrication method is described to form high aspect ratio, complex structures. This fabrication method combines nano-imprint lithography and photolithography together, to produce macro-scale features with micro-scale structures on them in a single process sequence, with one ultraviolet exposure step. The imprint step used a prefabricated stamp to directly emboss the photosensitive polymer prior to ultraviolet exposure without affecting the photosensitivity of the polymer. A temporary glass layer was deposited over the imprinted structure to preserve the fine features so that the large-scale photodefinition process could be completed. Diffractive grating features were photodefined on top of polymer pillars.