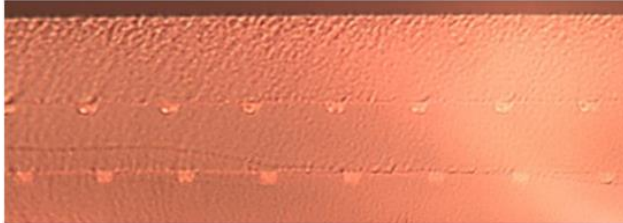


FIREFLY - Status of results in April 2014

Multilayer imprinting

We have succeeded in making a two-layer stack of waveguides using Ormocer materials using the nanoimprint lithography process. Good alignment between layers has been achieved.



Light bending with Photonic crystal structures

3D photonic crystals have been made using silica spheres using three different deposition processes: sedimentation, spin-coating and capillary printing. The quality of the 3D stacked particles depends on the process, and the sedimentation shows the most promise. Light in the infrared region of the spectrum is reflected from well stacked regions.

Fibre-waveguide coupling tools

New tools have been designed and built to allow passive alignment between single-mode fibre arrays and polymeric waveguides made by Laser Direct Imaging or imprinted in Ormocer polymer. The tools are currently being put together for use.

VCSEL embedding

1550 nm VCSELs have been successfully embedded in dry etched holes in silicon wafers. The VCSELs were positioned and overcoated with a polyimide layer and using laser ablated micro-vias connected through sputtered copper.

Low loss polymers

New polymeric materials with low optical loss (0.7 - 1.0 dB/cm at 1550 nm) have been developed. The materials are miscible and have different refractive indices permitting tuning of the core and cladding index. Processing by imprinting and lithographic techniques are ongoing.