Forschungszentrum Karlsruhe
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Photonic Integrated Circuits by DUV-induced Modification of Polymers for Telecom and Sensor Applications

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Motivation

Novel **Sensor** and **Telecommunication** Applications Require Innovative Manufacturing Tools for the Realization of **Photonic Integrated Circuits** (PICs).

- **Low Cost Material**

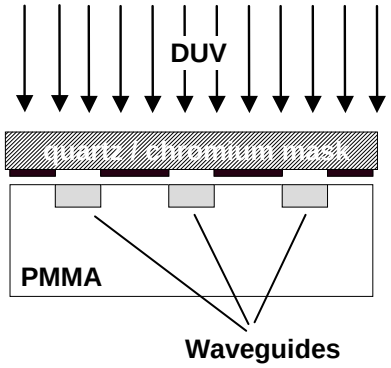
  ⇒ Polymer Material
- **Simple Waveguide Fabrication**

  ⇒ DUV Lithography
- **Low Cost Device Realization**

  ⇒ Integration of PICs with Micro Optics

Fabrication

Change of Refractive Index by DUV - Exposure of PMMA

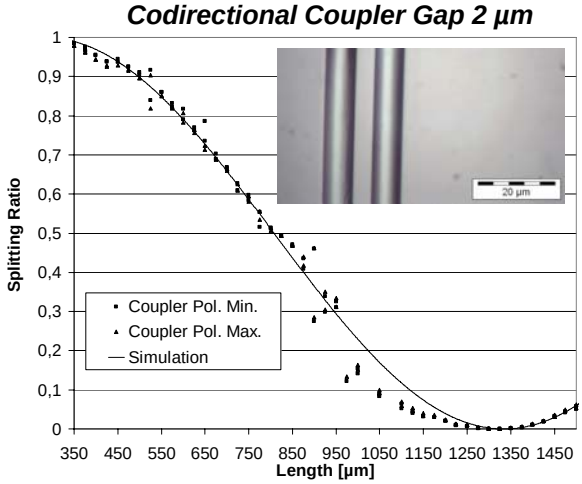


Figures

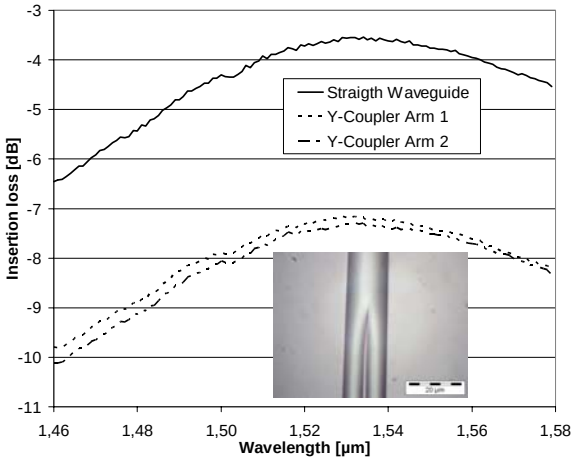
Waveguide Loss @ 1550 nm:	1 dB/cm
Polarization Dependent Loss:	< 0.15 dB
Fiber-Chip Coupling Loss:	0.5 dB / Facet
Excess Loss – Y-Coupler:	0.5 dB
Excess Loss – Directional Coupler:	0.5 dB
Excess Loss – MMI:	1 dB

Results

Codirectional Coupler Gap 2 µm



Y – Coupler – Branching Angle 1.75°



MMI Coupler – Width 21 µm