Results I – Viscosity adjustment

- Adjustment: co-monomer content
  - Ethylene glycol dimethacrylate (EGDMA)
  - Benzyl methacrylate (BMA)
  - Dopant: e.g. phenanthrene, no strong influence on viscosity

Results II – Passive material

New approach for increase

- Mixture of monomers: Genomer2263 / BMA
- Increase via 2 dopants at the same time:
  - 9-vinylcarbazole / 9-bromophenanthrene

- Maximum refractive index of $n_{D, 20} = 1.638$


- Two separated waveguides with several mm gap
- New photo curable liquid material in gap deposited
- UV-polymerization closes gap by self-writing

Results III – Active material

Materials: luminescent, organic chromophores

- Rare earth complex: Eu(DBM)$_2$Phen
- 9,10 Diphenylanthracene
- Mixed into monomer matrix

Proof of concept

- 2.5 wt% Eu(DBM)$_2$Phen
- Inkjet printed on PMMA substrate
- Substrate temperature: 60 °C
- Printing temperature: 40 °C
- UV-Polymerization

Applications: Active optical fiber

- Active material optical fiber, excited by 405 nm laser light
- Material: EGDMA + 2.5 wt% Eu(dbm)$_2$Phen
- Conversion to red light
- Inkjet-printed waveguides: P. Bollgrün, Poster P46

Summary

- Refractive index tunable: 1.44 < $n$ < 1.63
- “Cold” polymerization by UV-light possible
- Viscosity adjustment for: inkjet- and flexoprinting, spin coating, hot embossing
- Conversion of light with active fluorescent material

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