Summary
The target of this project is to create optically diffusing films to increase the extraction efficiency of optical components. The layer should show the following properties:

- Homogeneous and transparent layer
- High scattering
- Adjustable refractive index

Introduction
- With a scattering layer, more light couples out from the OLED

Materials
The three basic materials:

Table 1: Overview of the basic materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntholux 291 EA</td>
<td>H₂O₂ C₆H₅COCH₂OH</td>
</tr>
<tr>
<td>Bisphenol A glycerolate dimethacrylate</td>
<td></td>
</tr>
<tr>
<td>Sartomer SR348L</td>
<td></td>
</tr>
</tbody>
</table>

The additives are:

Table 2: Overview of the additive materials in the mixtures

<table>
<thead>
<tr>
<th>Material</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzyl methacrylate</td>
<td></td>
</tr>
<tr>
<td>1,3-Butadiol dimethacrylate</td>
<td></td>
</tr>
<tr>
<td>Bisphenol A glycidyl methacrylate</td>
<td></td>
</tr>
<tr>
<td>OligoC2 4.0</td>
<td></td>
</tr>
<tr>
<td>IronP格Fe3(4-Methylene)P格</td>
<td></td>
</tr>
</tbody>
</table>

Viscosity behavior
- Viscosity is a key criterion for production method (screen printing or inkjet)
- Viscosity decreases with increasing temperature

Adjastable refractive index
- Polarizable π-electrons influence the refractive index [1]
- 9-Vinylcarbazole has a high number of π-electrons
- Increasing 9-vinylcarbazole content in polymer, increases the refractive index

Production method
Ink-jet Pixdro LP50:
Piezo settings influence the drop shape, drop size, drop velocity and target accuracy.

UV exposure (Hoenle, 405 nm, 10 min):

Optical characterization
Important factors are haze and transmission:
- Haze = Degree of scattering in %

Conclusion
A simple method to produce highly diffusing optical layers with high refractive index has been presented. These optical films can be used to increase the extraction efficiency of optical components. Films with a refractive index of 1.62 at 589 nm and 20°C were successfully produced.

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References