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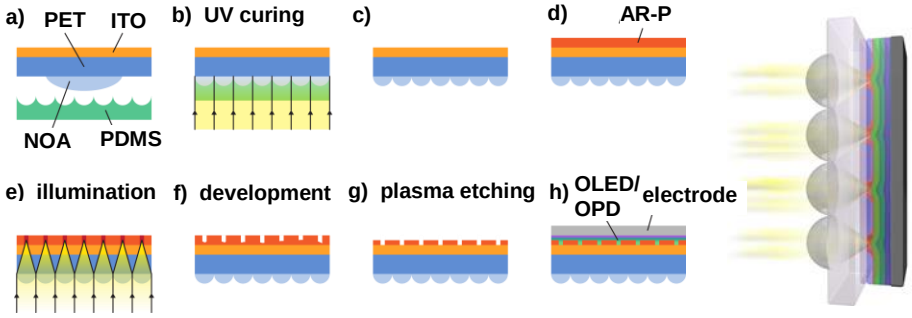
Bachelor's Thesis

Fabrication of microlens arrays (MLAs) with self-aligned apertures for OLEDs, plenoptic camera and organic photodiodes (OPDs)



Motivation

Microlens arrays (MLAs) are micro-optical elements widely used for light management in optical sensors, photovoltaics as well as in organic light emitting diodes (OLEDs). MLAs can not only help to incouple/outcouple light for the aforementioned devices, they can also be used for shaping the angular emission pattern of OLEDs.

In order to simultaneously master the alignment of the device, we illuminate an insulating photoresist layer on the opposite side of the substrate through the microlenses, thereby introducing self-aligned apertures of high quality, confining the area of other opto(electronic) components such as OLEDs, OPDs and Bragg stacks which will be later printed inside and on top of the apertures. This straightforward self-alignment approach can be upscaled to large areas, without using any additional high-precision positioning tools.

Tasks

Within the scope of this thesis, the candidate will be carrying out experiments inside a cleanroom and working on related simulations such as ray-tracing simulation. The tasks can involve some of the following topics:

- Fabricate MLAs by nanoimprinting and/or inkjet printing
- Simulate the photolithography process
- Optimize and validate the processing parameters
- Fabricate directional-light induced apertures

Prerequisites

We are looking for candidates with strong motivation for experimental and related simulation work. Basic knowledge in optics and optoelectronics are expected. Experience of working in a cleanroom is favorable but not necessary. Good English skills are required.

Research areas
Opto(electric) components, photolithography

Location
LTI (Campus South)

Focus
Experimental and related computational work

Field of study
Optics & Photonics
Electrical Engineering
Physics
Mechanical Engineering

Entry date
As soon as possible

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