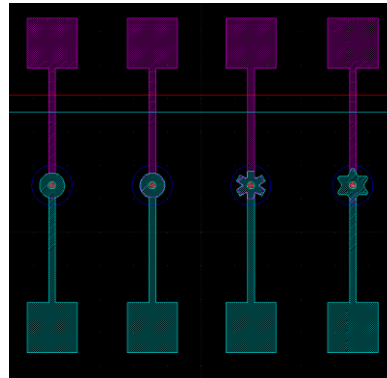
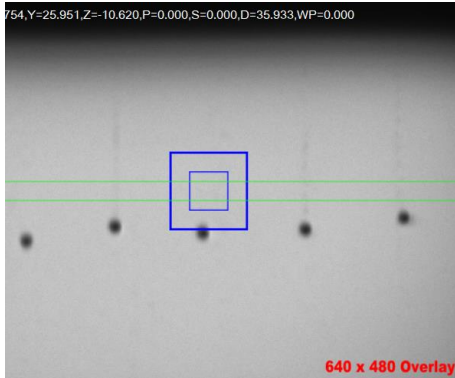


Master-/ Bachelor Thesis

Fabrication of piezoelectric micromachined ultrasonic transducer (PMUT)



Motivation

Piezoelectric materials are used in a variety of devices as both sensors and actuators. PZT, a common material, offers a high longitudinal effect combined with high stiffness (and thus lack of flexibility).

In contrast, the polymer P(VDF-TrFE) offers mechanical flexibility but a lower transverse effect. This material will now be used to investigate a variety of applications through printed sensors and actuators. One challenge is the semi-crystallinity of the polymer, which means that crystallization must be optimized in addition to the printing parameters.

Task

The aim of the thesis is to optimize the manufacturing process of printed PVDF-TrFE layers in order to obtain homogeneous layers with the highest possible proportion of the desired β -phase. This is to be characterized subsequently.

The fabrication process includes the selection and mixing of suitable inks, the printing process, the annealing procedures, and the integration of electrical contact layers.

The characterization contains the evaluation of layer quality using profilometer. AFM and SEM. Resonances on the electrical side will be investigated using an oscilloscope.

Prerequisites

Interest in functional layers, willingness to experiment, systematic and independent way of working and flexibility in solving problems. Skilled handling of technical equipment and basic knowledge of the piezoelectric effect are an advantage.

Research area

Printed piezoelectric layers

Type of work

Experimental
Simulation

Field of Studies

Electrical engineering
Physics
Or similar

Starting date

Immediately

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