



## Integration of polymer micro magnets by optical lithography

HSG-IMIT



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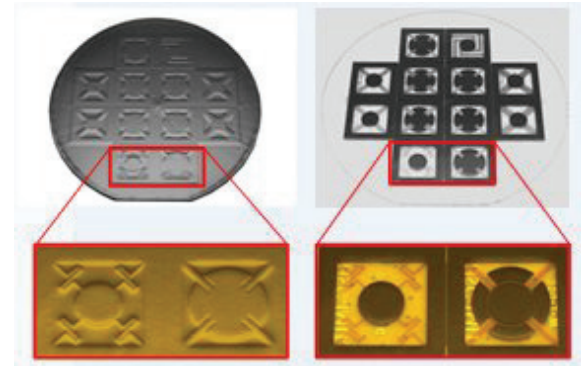
### BACKGROUND and BASICS

Magnetic micro actuators based on the Lorentz force uses polymer magnets in injection molding technologies.

Disadvantages:

- minimum geometry 0,5 mm,
- packaging technology for magnet integration,
- high production costs.

A new idea is the integration of magnets at wafer level by using UV-sensitive filled polymer films.



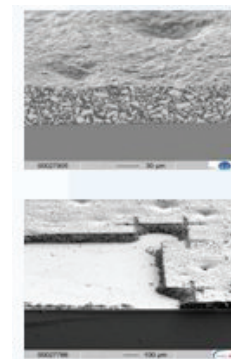
### CONCEPT and SOLUTION

#### Compound material

- NdFeB-powder is mixed in a polymer e.g. SU-8, PI

#### Methods

- Spin-coating of different substrates e.g. glass, metal, silicone, polymers
- Bake process to drive off carrier solvents
- Structuring: optical lithography with i-line
- Temper process for crosslinking
- Structure Development



#### Process steps



### STATUS and OUTLOOK

#### Vibration sample magnetometer

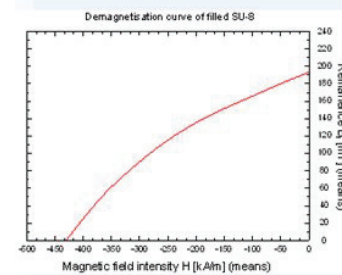
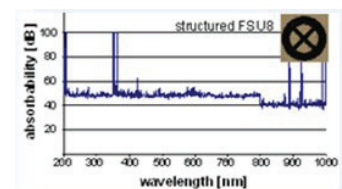
- Filling degree of compound: 76,6 wt%
- Remanence of 60 µm film thickness: 200 mT
- Magnetic field intensity: 450 kA/m

#### Actual status of work

- Analyses of max. filling degree and structuring possibilities
- Characterization of compound material (absorbability, layer quality, structure quality, limits et al.)

#### We are looking for:

- Industrial partner for application tests
- Research partner for material characterization and manipulation



#### Contact:

Claudia Kallenbach, HSG-IMIT, 78052 Villingen-Schwenningen,  
 Phone/Fax: +49 7721 943267/210, [Claudia.Kallenbach@hsg-imit.de](mailto:Claudia.Kallenbach@hsg-imit.de), [www.hsg-imit.de](http://www.hsg-imit.de)