

Technologietag Leichtbau am Fraunhofer ICT  
Marcel Laux, 05.11.2025

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# Optimierung mesoporöser Haftsichten für direktgefügte Kunststoff-Metall-Hybridstrukturen im Montagespritzgießen

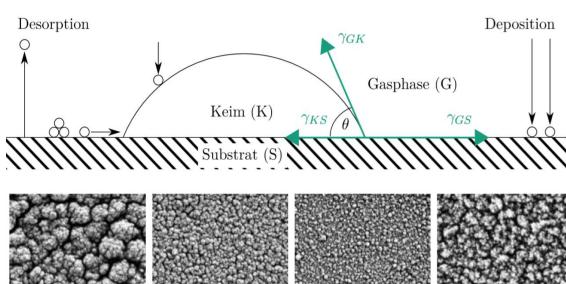
# Einführung

## Forschungsfrage und methodisches Vorgehen

How should mesoporous silica-based adhesion layers be designed to ensure high-strength polymer-metal interfaces in thermoplastic injection molding

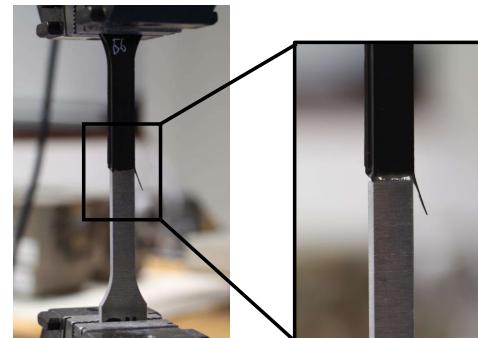
### Schichtabscheidung

- Anlagentechnik
- Schichtcharakterisierung durch Bildauswertung
- Regressionsmodell Schichtwachstum



### Grenzflächenfestigkeit

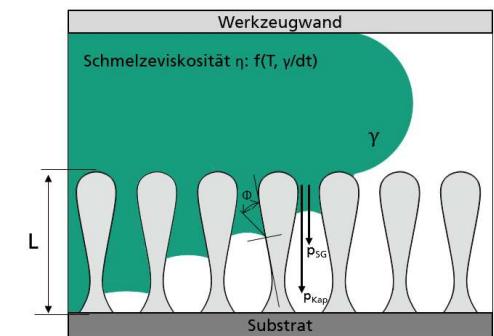
- Korrelation zwischen Schichtmorphologie und Festigkeit
- Mechanisches Wirkmodell



Offen

### Infiltration

- Infiltrationsverhalten der Schichten
- Robustheit



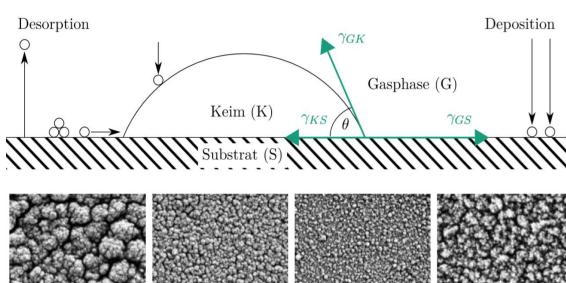
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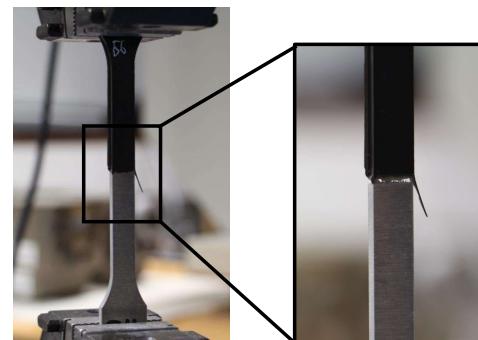
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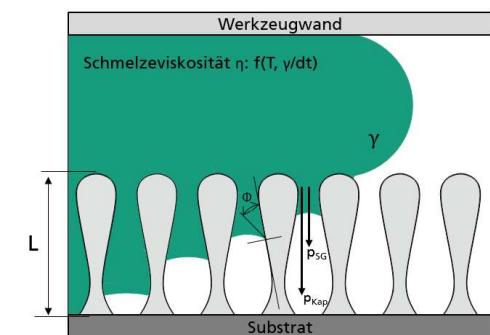
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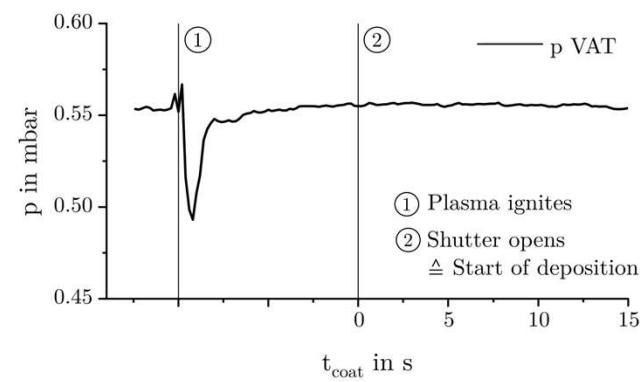
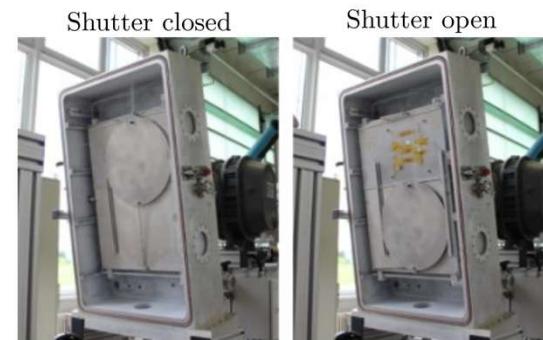
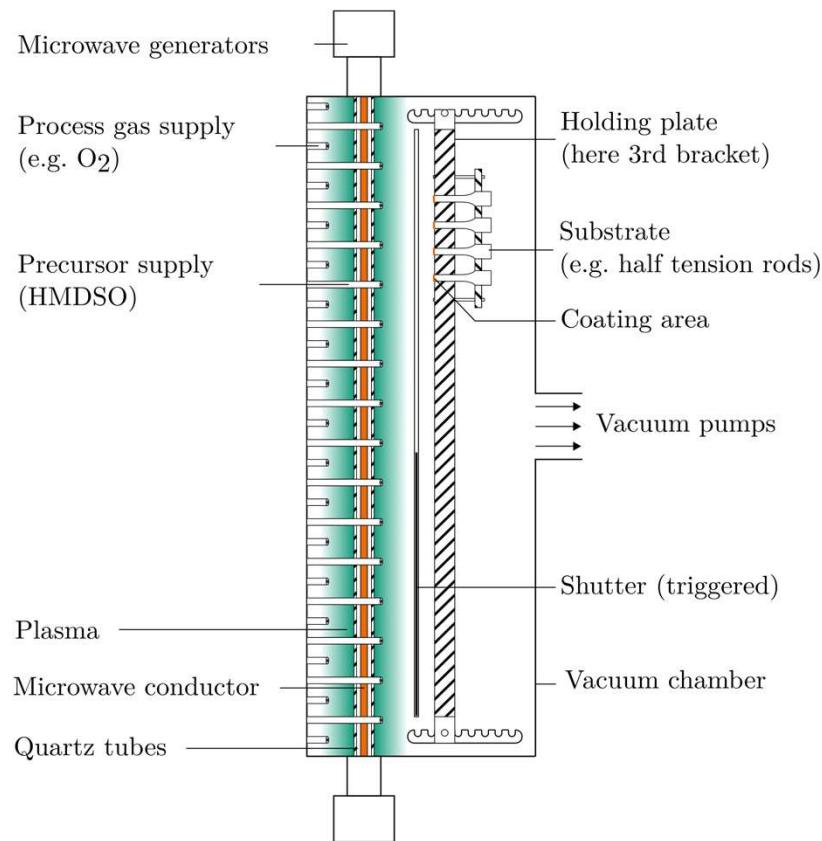
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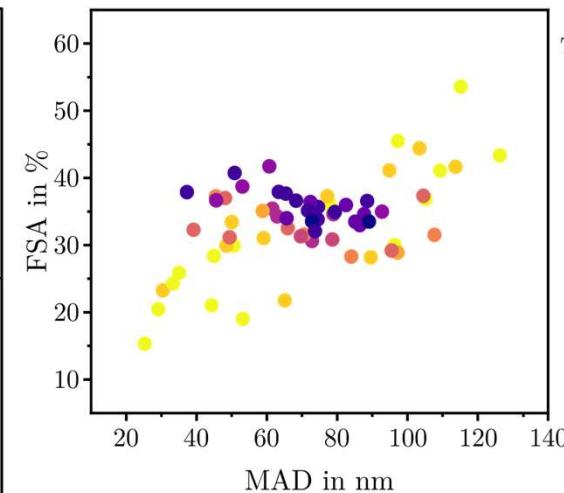
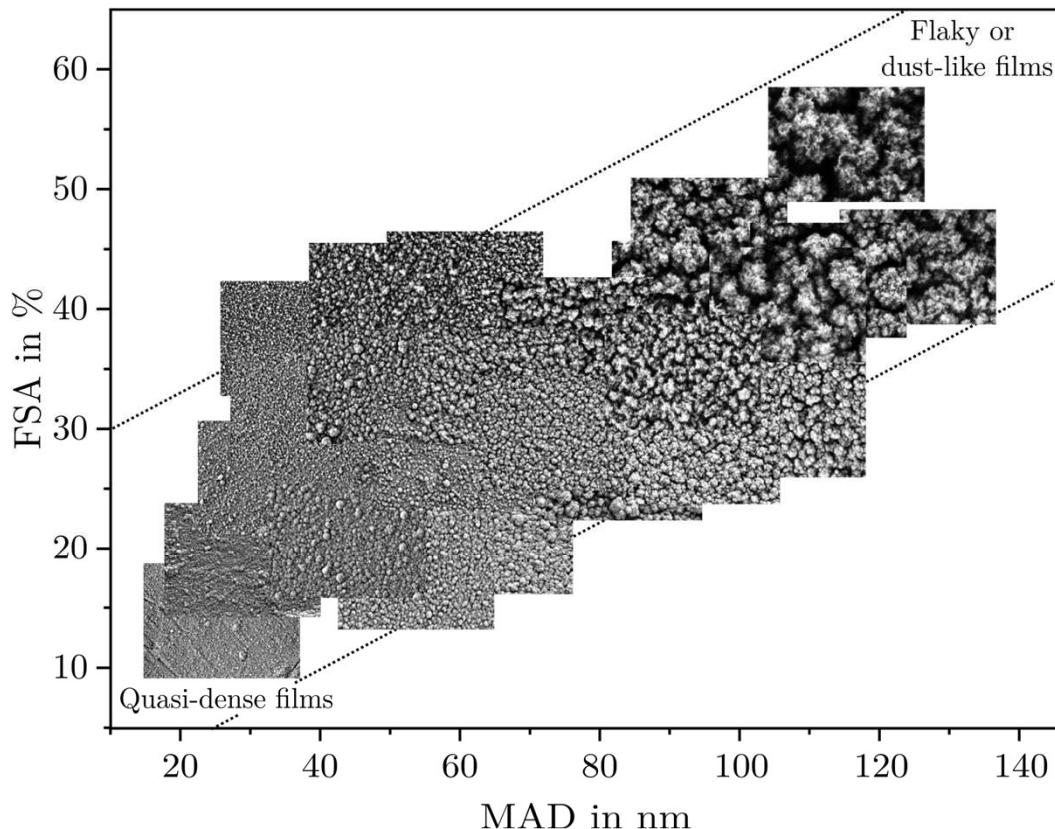
# Schichtabscheidung

## Aufbau der Anlage und Prozessablauf



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## Grenzflächenfestigkeit Korrelation zwischen Schichtmorphologie und Festigkeit

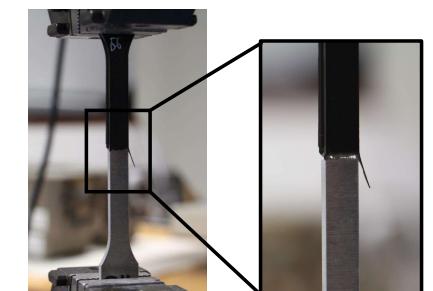


\* Pound per square foot (psf)

1 MPa = 145 psi

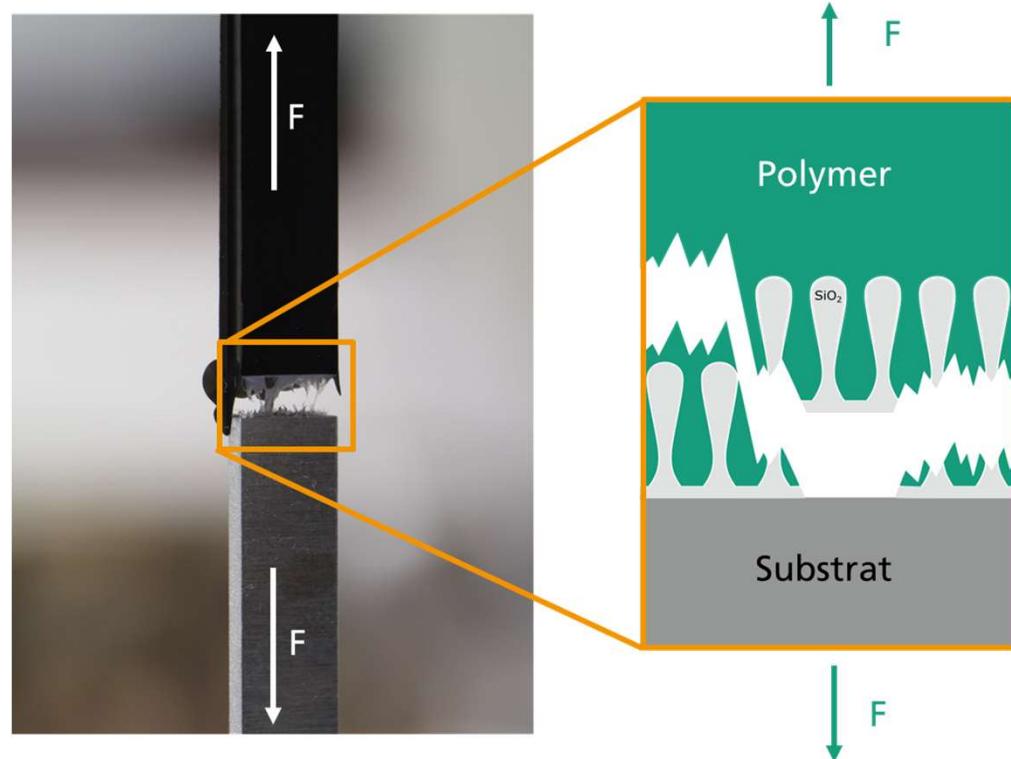
1 MPa =  $2.419 \times 10^6$  lb/ft<sup>2</sup>

\*\* Fläche Normzehnagel = 200 mm<sup>2</sup>

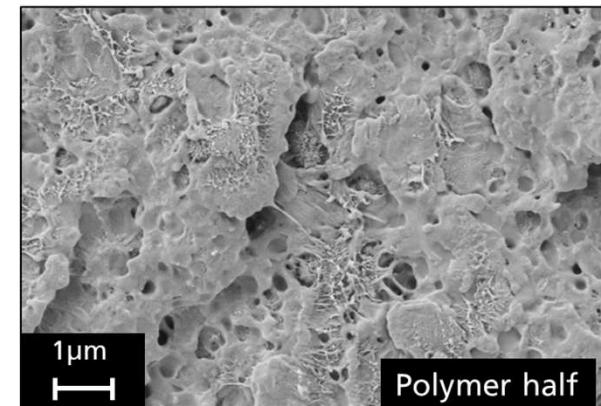


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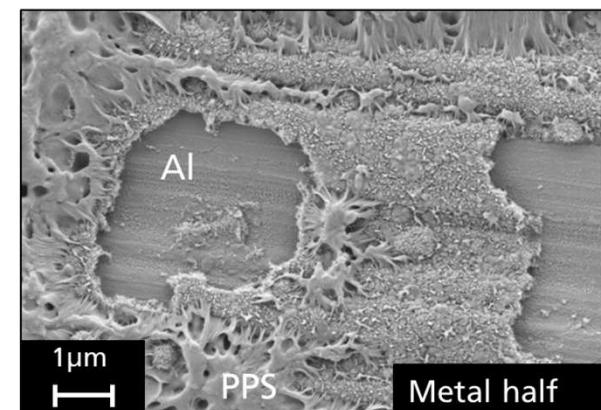
## Korrelation zwischen Schichtmorphologie und Festigkeit



PPS

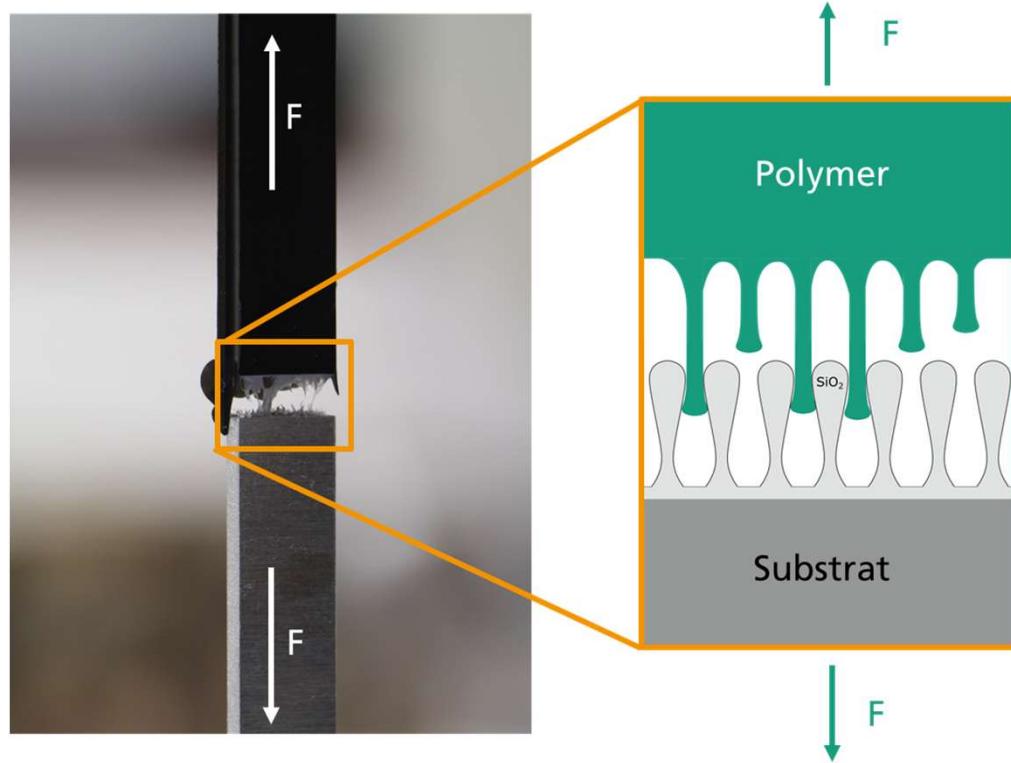


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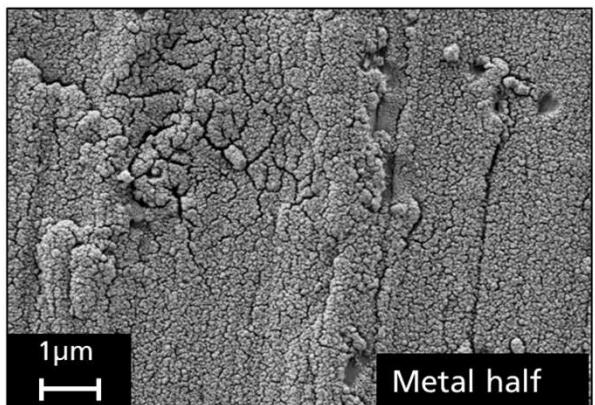
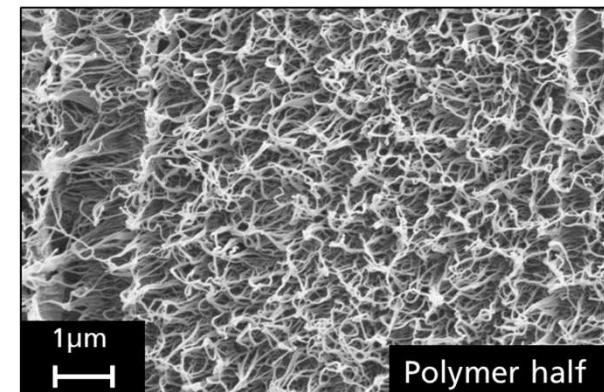


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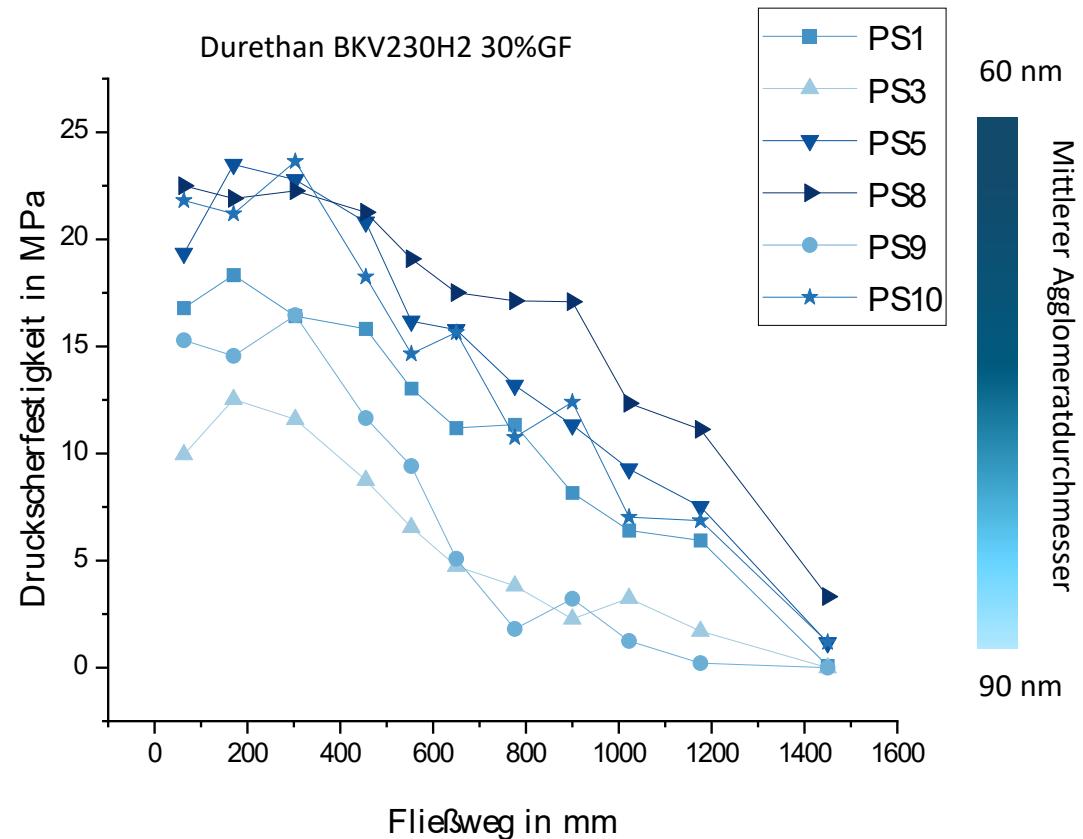
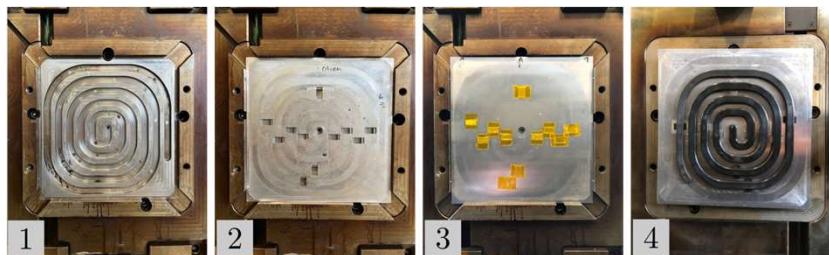
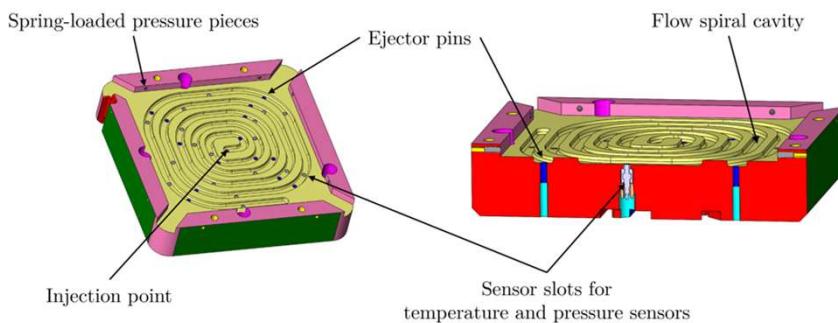


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# Infiltration

## Prozessrobustheit beim Überspritzen der Schichten



# Kontakt

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Vielen Dank für Ihre  
Aufmerksamkeit

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