

**P. Pandey, S. Ziesche**  
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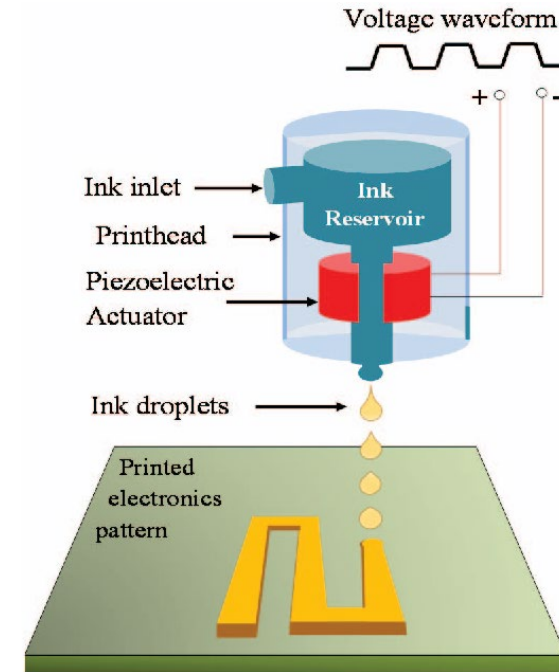
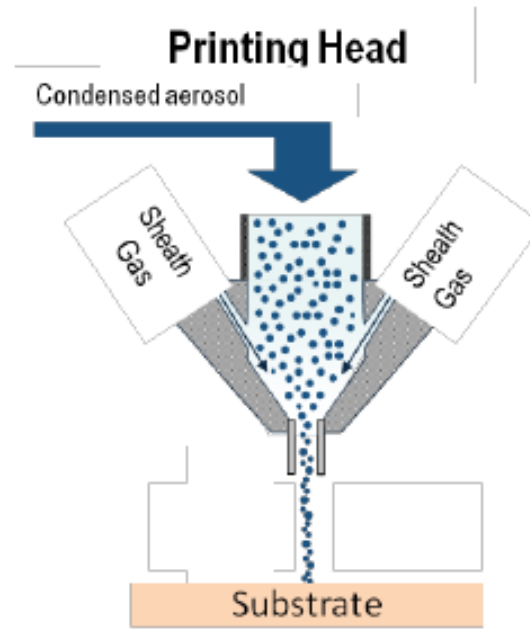
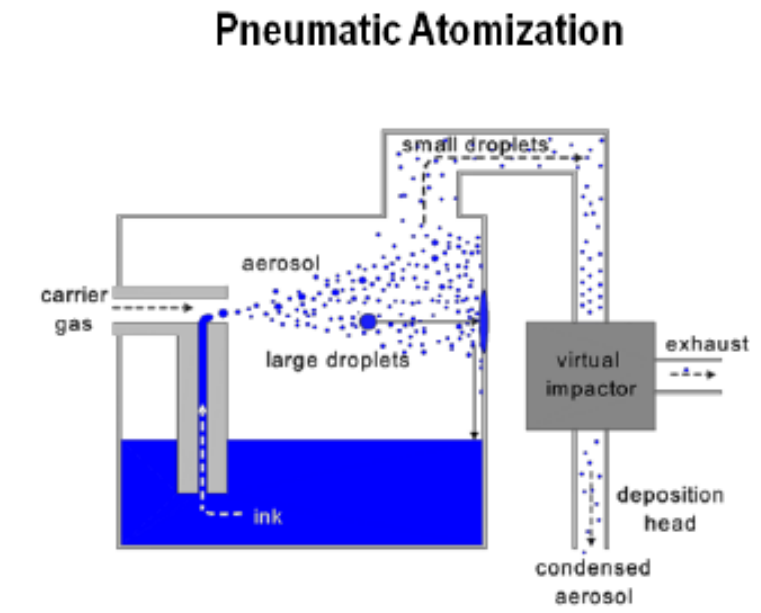
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# JAMES-IKTS AME Workshop



# Functional Printing Technologies @ OE322

# Functional Printing Technologies @Fh. IKTS



## ■ Aerosol Jet Printing Technology

- Droplet size around 1 ~ 5  $\mu\text{m}$
- Ink viscosity in range of 1-1000 $\mu\text{m}$
- Standoff distance 1 ~ 5mm

## ■ Inkjet Printing Technology

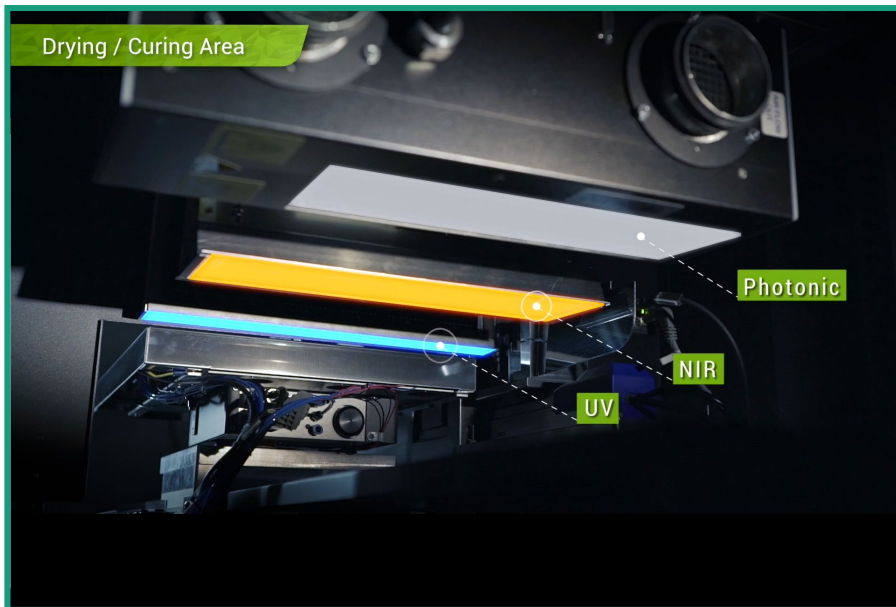
- All are piezoelectric head
- Droplet size, Ink viscosity based on printhead
- Standoff distance ~1 mm



# Functional Multi-Material 3D-printing and Sintering/Curing in one Machine

Bringing ceramic multilayer manufacturing to the next level

- Fully digital and maskless technology
  - Layer-wise print of up to 4 materials possible
- Wide range of substrate management (305\*305\*10 mm)
- Multimaterial deposition technologies
  - 3 Inkjet Printheads & 1 Aerosol-jet technologies



- In-line post treatment processes
  - 3 different Drying & Curing modules (UV, NIR, Photonic)
  - The whole working area of 305 x 305 mm<sup>2</sup> is cured by the module in single-pass.

# Functional Multi-Material 3D-printing and Sintering/Curing in one Machine

Bringing ceramic multilayer manufacturing to the next level

Head Slot	Slot 1	Slot 2	Slot 3	Slot 4
<b>Model</b>	Dimatix DMC Samba G3L	Dimatix Sapphire QS-256/80 AAA	Konica Minolta KM 1024 iSHE	Optomec Aerosol Jet
<b>Nozzles number</b>	12	256	1024	1
<b>Drop size</b>	2,4 pL	80 pL	6pL	1-5µm diameter droplets
<b>Particle size</b>	< 250 nm	< 1-2 µm	< 450 nm	< 1-2 µm
<b>Images</b>				



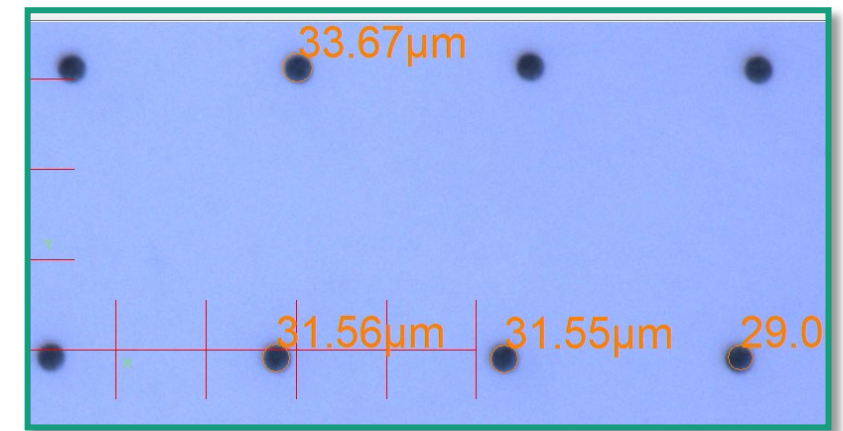
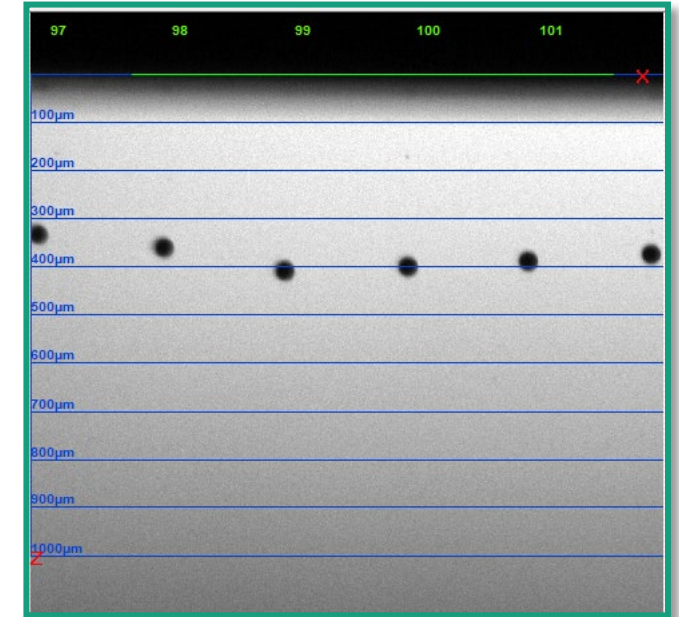
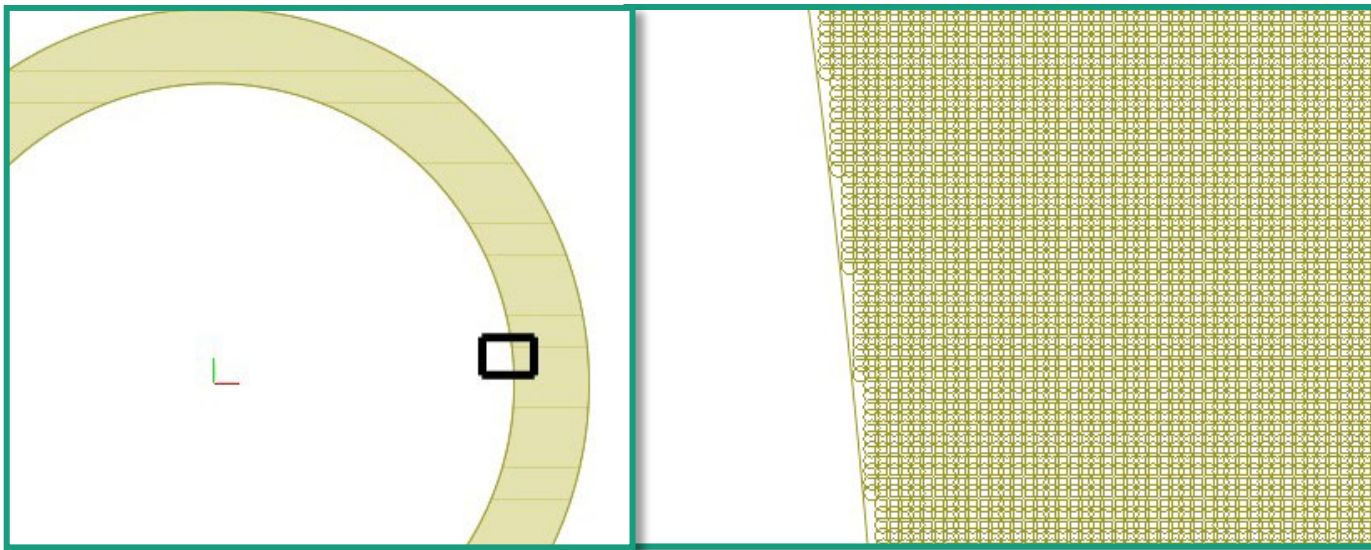


# Functional Multi-Material 3D-printing and Sintering/Curing in one Machine

Bringing ceramic multilayer manufacturing to the next level

## ■ Advanced Software

- **Ceraslice:** Layer thickness, Filling strategy, Advanced Simulator stage
- **DropAnalyzer:** Jetting analysis, and control in real time, Active nozzle detection
- **FabAnalyzer:** Full printing area acquisition, Post-printing characterization




# Functional Multi-Material 3D-printing and Sintering/Curing in one Machine

JAMES Coin



- Ag printed & cured by Photonic Sintering
- To Do's
  - Dielectric Crossover
  - Conductive layer

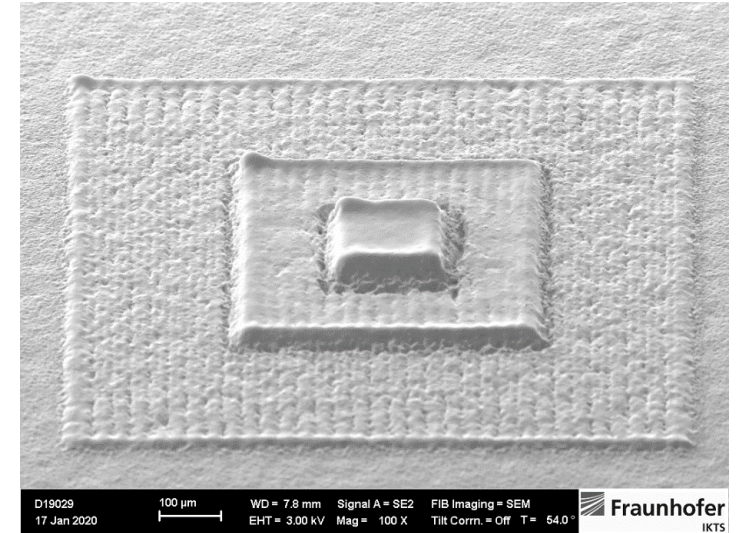
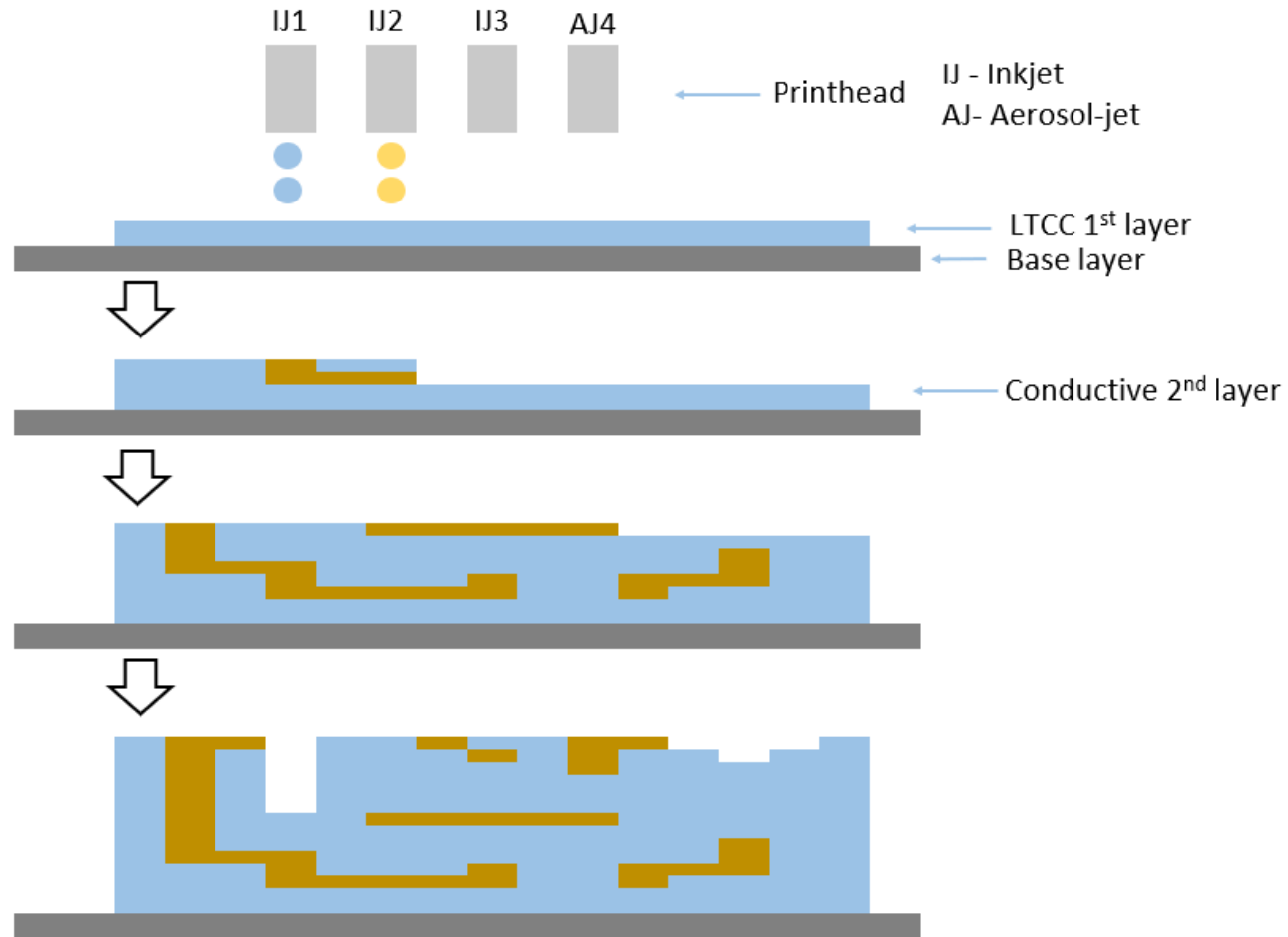


# Manufacturing of AME layout



# Technical approach I

## Maskless Via Multimaterial Inkjet & Aerosol-jet Printing



- Advantages
  - Fine edge quality and high Resolution
  - High accuracy
  - Freedom in design
  - Multifunctionality

# Thank you for your attention!

## Contact

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