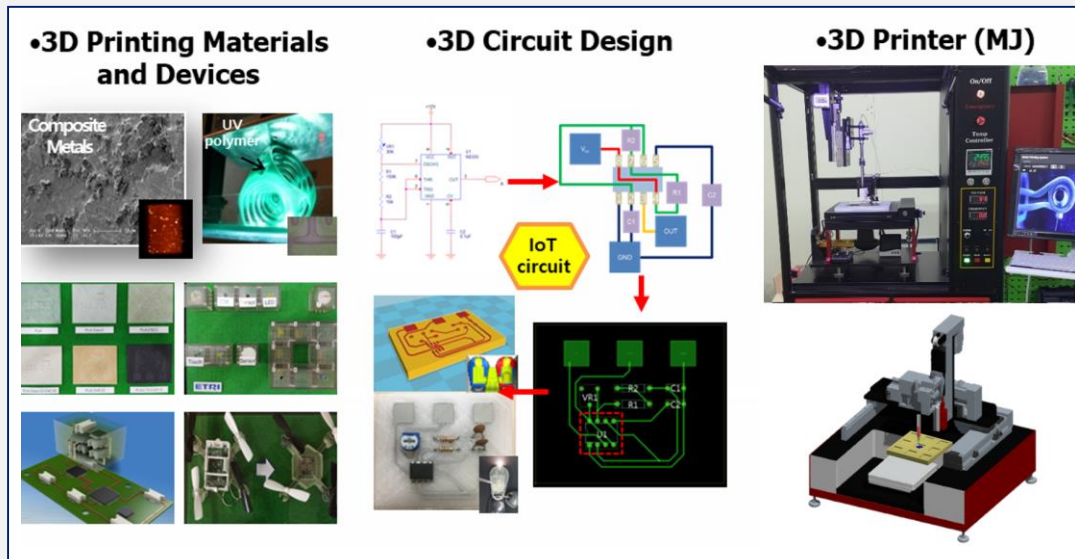
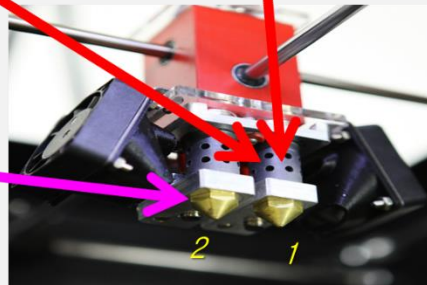


# 3D Printing with Composite Materials



## Technology Summary

- 3D printing electronics is the manufacturing of electronic devices by 3D circuit's modeling and 3D printing processes.
- 3D printed electronic devices are equivalent to the plastic itself with the circuitry (i.e., wiring and lumped RLC circuits) not only on exterior surface but also within interior structures
- Development of composite metals with a high conductivity, low  $T_{\text{melt}}$  ( $< 400^{\circ}\text{C}$ ), various viscosity ( $10 \sim 10,000$  cp), and various carot ( $< 22$  K)
- Capability in 3D printing the composite metals (Cu, Au, etc) and polymers simultaneously by a material jetting(MJ) or FDM

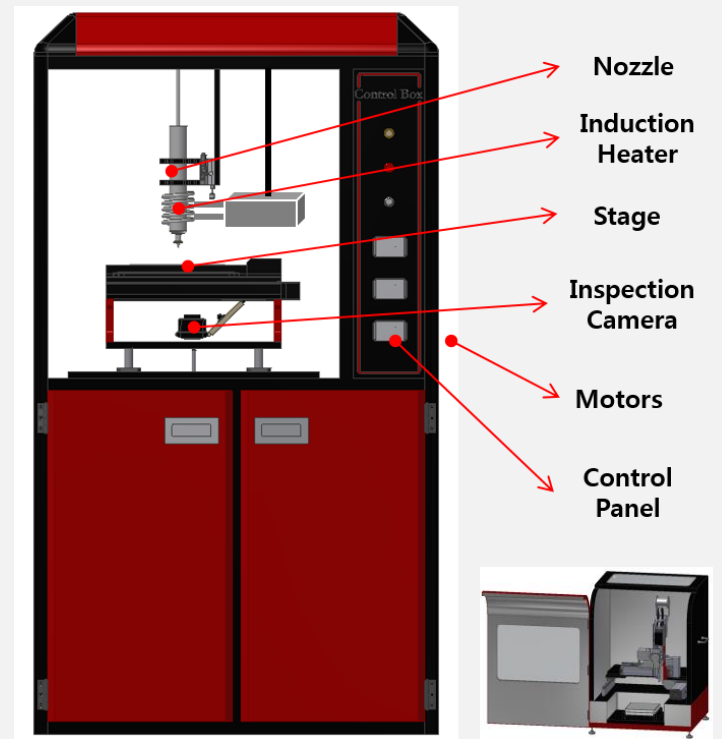


## Advantages

- Metals: High electric conductivity (Resistivity:  $< 10 \mu\Omega\cdot\text{cm}$ )  
High carot (Purity:  $< 22$  K)
- Easy to control  $T_{\text{printing}}$  and viscosity
- Dual nozzle: Composite metals(Metal particles + Eutectics),  
Polymer(ABS, PLA, PC, etc)
- Patterning size:  $100 \sim 1,000 \mu\text{m}$
- No subsequent heat-treatment

## Potential Applications

- Material Jetting 3D Printer



## Core Patent

- EXTRUDER FOR METAL MATERIAL AND 3D PRINTER USING THE SAME, US 15/583155 (2017.05.01)
- 用于三维打印的金属材料、其制法和用其的三维打印方法, 2016104316.3
- 用于金属材料的挤出机和使用挤出机的3D打印机, 201710300497

## Development (TRL : 7)

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