CRYOGENIC 3D PRINTING

Tech ID: 25341 / UC Case 2016-035-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,584,066	02/21/2023	2016-035
United States Of America	Issued Patent	11,130,277	09/28/2021	2016-035

BRIEF DESCRIPTION

3D printing uses additive processes, which add layers on top of each other, to generate shapes. In order to do this, the material used undergoes a phase transformation, from a malleable state to a solid state. This process incorporates the new layer onto the previous layer. Most currently used 3D printing technologies use a phase transition temperature that is higher than the room temperature, which allows printing in air at room temperature. The 3D printing device heats the material to a malleable form, then deposits a layer that cools into a solid. This method does not, however, allow sufficient structural or temporal control for printing biological materials.

UC Berkeley researchers have developed methods and devices for cryogenic 3D printing that enables printing with biological materials. Complex structures can be generated when the object is immersed in a liquid coolant, and this immersion also ensures that already printed layers remain at a constant temperature.

SUGGESTED USES

- Tissue engineering
- Printed drugs
- Food technology

ADVANTAGES

- Precise micro- and macrostructural control
- Generates complex structures
- Can be used with easily degraded materials, such as cells
- Temperature-controlled

PUBLICATION

Cryogenic 3D printing for tissue engineering

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OTHER INFORMATION

KEYWORDS

printing, cryogenic

CATEGORIZED AS

- **Biotechnology**
  - Other
- **Computer**
  - Other
- **Materials & Chemicals**
  - Other
- **Research Tools**
  - Other

RELATED CASES

2016-035-0

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