Laser Additive Manufacturing Method For Producing Porous Layers.

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OTHER INFORMATION

CATEGORIZED AS

- **Energy**
  - Storage/Battery
- **Materials & Chemicals**
  - Nanomaterials
- **Medical**
  - Devices
- **Nanotechnology**
  - Materials
- **Engineering**

» Other

BRIEF DESCRIPTION

A method of metal additive manufacturing which allows for production of porous products with pore size potentially down to the nanometer-scale.

RELATED CASES

2020-603-0

SUGGESTED USES

·Manufacture of electrodes for electrochemical systems

·Printing of titanium supports which can be utilized to grow body tissue

·Creation of biocompatible supports for spine surgery

·Manufacture of titanium sheets as catalyst support and a porous transfer layer in fuel cells

FEATURES/BENEFITS

- » Possibility to reach pore sizes down to nanometer-scale
- » Novel and environmentally safe (no harsh chemicals) etching process using a sacrificial template
- » Ability to superimpose this method with previous methods of pore creation in order to produce metallic layers with hierarchical porosity

FULL DESCRIPTION

Traditionally in selective laser melting (SLM) 3D metal printing, solid structures are grown layer-by-layer by using a laser that selectively melts the material of each layer in a metal powder substrate. Currently, ordered porous structures are grown using a structured mesh as input. In this technique the resolution of the mesh, and thus the pores produced, is limited by the spot size of the laser which typically ranges from tens to hundreds of microns.

To produce porous structures on a smaller size scale, the researchers at UCI have incorporated a novel etching process to print metallic layers with hierarchical porosity without the use of harsh chemicals in the etching process.The researchers believe that this technology can be utilized as bodily scaffolds/supports as well as fuel cells.

STATE OF DEVELOPMENT

The method is currently in the conceptual stage.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20230039200	02/09/2023	2020-603

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