AzTE
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# Direct Support Dissolution for 3D Printed Metals and Oxides

**AzTE Case # M17-047P**


## Inventors

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## Background

Complex 3D printed parts often require supports during the 3D printing process. While dissolvable supports are common in 3D printing for plastics, supports for metals and oxides have many limitations. Traditional, monolithic metal 3D printed supports often need to be machined off. This process is expensive and restricts part design, as the supports must be machine-accessible. Metal 3D printing is revolutionary for rapid prototyping and production in many industries. Therefore, there is a need for an inexpensive and effective method to remove supports from 3D printed metal parts.

## Invention Description

Researchers at Arizona State University have developed a method for the easy removal of supports or sections of a 3D printed metal/oxide structure by directly dissolving the supports using chemical or electrochemical means. This new process dramatically simplifies the support removal process for metals and oxides. For example, this method allows for new design freedoms by removing the restriction that support structures must be machine accessible – now they must be merely fluid accessible. This process can be applied to dissolvable supports for many 3D printed materials, such as metals, oxides, ceramics, and polymer additive manufacturing. Additionally, this new process requires no change to existing 3D printing tools and is compatible with powder-bed 3D printers.

## Intellectual Property Status:

*Pending*

## Potential Applications

- Metal 3D printing
- Additive and subtractive manufacturing
- Rapid prototyping

## Benefits and Advantages

- **Increased Design Freedom** – Fluid support removal allows for more efficient support removal, which increases design freedom.
- **Lower Costs** – This is a simple technique that does not require elaborate machinery to remove support structures.
- **Wide Range of Application** –This technique covers a broad range of metals as both the "part" material and the "sacrificial" support material.
- **Adaptable** - Process can be designed to be self-limiting or self-terminating.
- **Versatile** – Can be used to retrofit existing power-bed 3D printers.


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