

New dissolvable metal support enables 3-D printing of complex metallic structures

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Credit: Mary Ann Liebert, Inc., publishers

Researchers have fabricated dissolvable carbon steel structures using 3D printing technology that can provide temporary support for components of larger stainless steel structures made by additive manufacturing. The first-of-its-kind soluble metal support is subsequently removed via electrochemical etching in nitric acid with bubbling oxygen, as described in an article in *3D Printing and Additive Manufacturing*.

The article "Dissolvable Metal Supports for 3D Direct Metal Printing " demonstrates an application of this novel approach, in which the researchers printed and later dissolved a metal structure to support a 90o overhang. Coauthors Owen Hildreth, Arizona State University (Tempe), Abdalla Nassar and Timothy Simpson, Pennsylvania State University (State College, PA), and Kevin Chasse, Naval Surface Warfare Center (W. Bethesda, MD), propose that this technique could dramatically reduce the amount of post-processing needed for 3D-printed metal components to remove support structures. They expect their method to be applicable to a broad range of metals and even oxides.

"This innovative new approach using Directed Energy Deposition for 3D printing of dissolvable metallic components, without the need for machining operations to remove the sacrificial support materials, creates opportunities for new types of applications," says Editor-in-Chief Skylar Tibbits, Director, Self-Assembly Lab, MIT, and Founder & Principal, SJET LLC. "I'm excited to see what effects this research has on the future of [metal](#) printing."

More information: Owen J. Hildreth et al, Dissolvable Metal Supports for 3D Direct Metal Printing, *3D Printing and Additive Manufacturing* (2016). [DOI: 10.1089/3dp.2016.0013](https://doi.org/10.1089/3dp.2016.0013)

Provided by Mary Ann Liebert, Inc

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