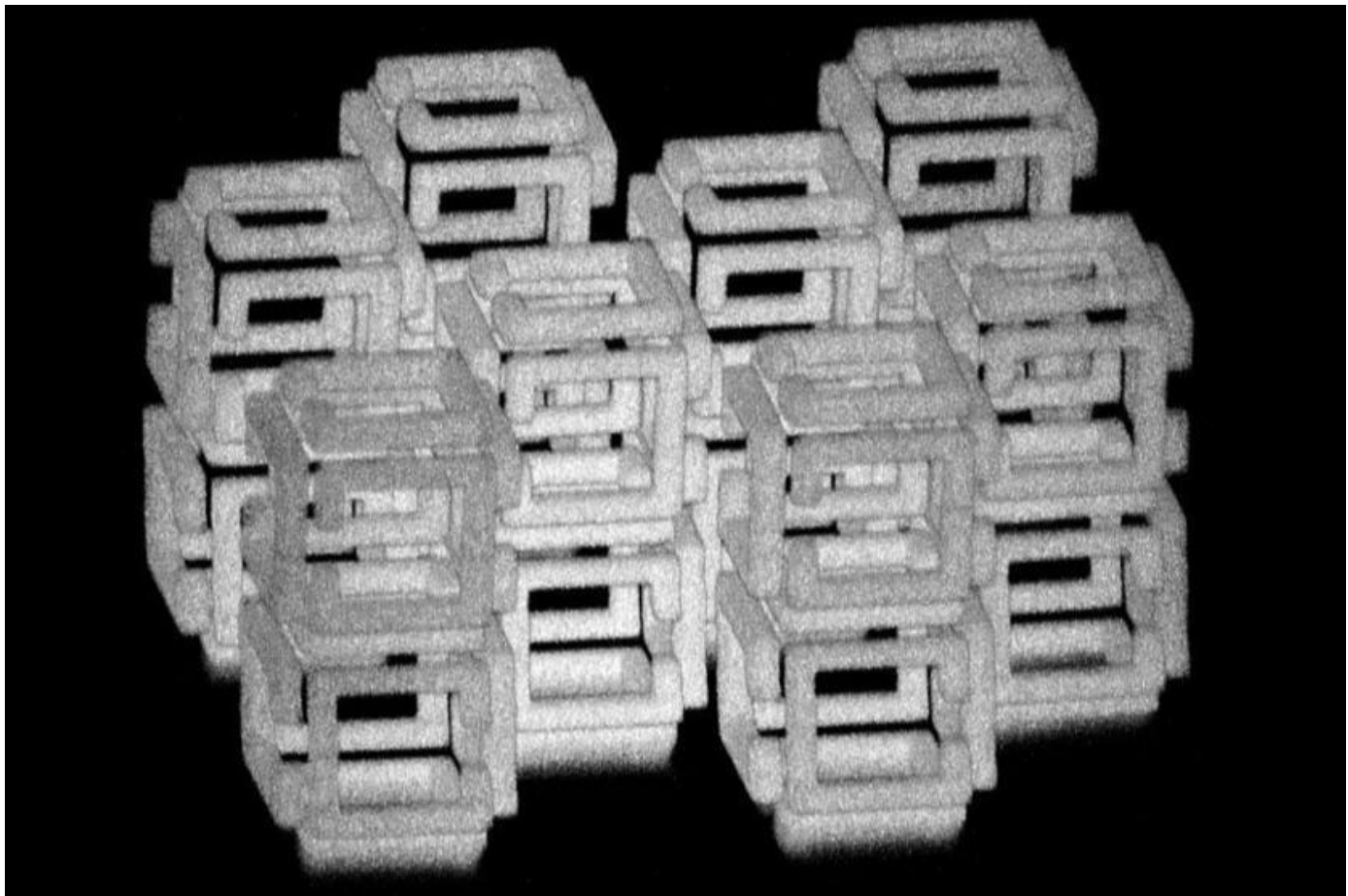


With the help of a substance found in disposable diapers, MIT researchers can now shrink objects really small



DANIEL ORAN

A complex structure prior to the shrinking procedure.

By [Martin Finucane](#) | GLOBE STAFF DECEMBER 20, 2018

MIT researchers say they've come up with a new way to fabricate tiny objects, and a key ingredient for the technique can be found in an unlikely place: the padding of

disposable diapers.

“It’s a way of putting nearly any kind of material into a 3-D pattern with nanoscale precision,” said Edward Boyden, a professor of neurotechnology at MIT. The new technique has been dubbed by researchers “implosion fabrication.”

Boyden is one of the senior authors of a paper on the technique that was published last week in the journal *Science*.

Here’s how it works: Researchers use a very absorbent material made of polyacrylate, which is commonly found in diapers. The material is bathed in a solution that contains molecules of fluorescein.

The researchers use a special laser to pin the fluorescein molecules to specific locations within the gel. The fluorescein molecules serve as “anchors or handles” that bind to other molecules that are added by researchers.

“You attach the anchors where you want with light, and later you can attach whatever you want to the anchors,” Boyden said. He said items that could be attached included a piece of DNA, a gold nanoparticle, or a quantum dot, which is a tiny particle made of semiconducting material.

At the end of the process, the researchers shrink the gel. The molecules that have been bound to the fluorescein handles — in the reverse of an explosion — come together to form 3-D objects.

Using the technique, the researchers can create any shape they want, the university said.

“With a laser you can already find in many biology labs, you can scan a pattern, then deposit metals, semiconductors, or DNA, and then shrink it down,” Boyden said.

The researchers are currently able to create objects that are around 1 cubic millimeter,

with features as small as 50 nanometers.

The tiny structures could be useful in fields from optics to medicine to robotics, the researchers said.

The paper's lead authors are graduate students Daniel Oran and Samuel Rodriques.

The new fabrication method is an advance in [nanotechnology](#), the science of making extremely small things.

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