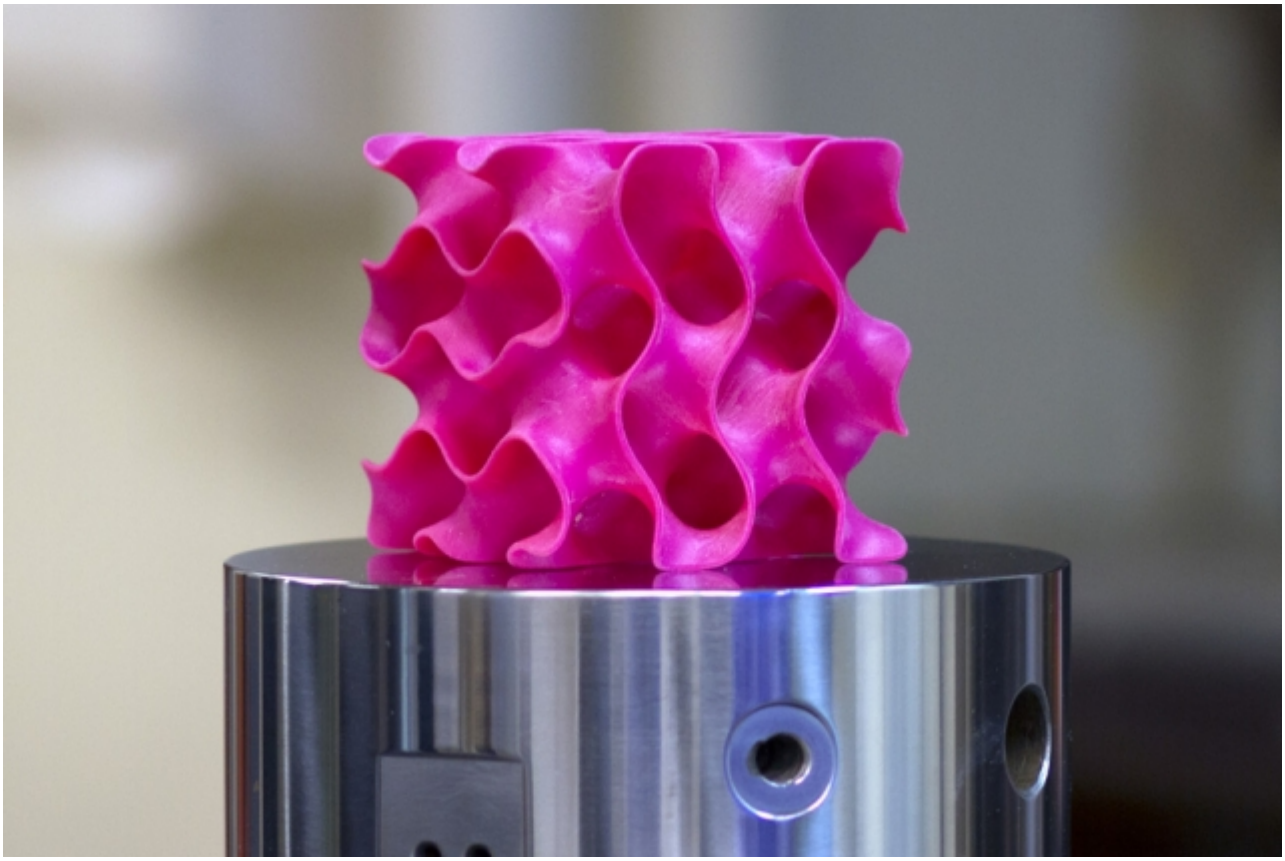
LIFE HACKS

MIT Engineers Make the Impossible: New Material Strong as Steel, Light like Plastic?

By bestfolkmedicine · 17/02/2022 · 2 min read



A research team from MIT developed a new material which they say is strong as steel, but light as plastic.

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This innovative material, according to the team, can be easily produced on a larger scale. Its use ranges from producing lightweight car or phone coatings to building blocks for massive structures like bridges.

The senior author of the study and Carbon P. Dubbs Professor of Chemical Engineering at MIT, Michael Strano says that we don't usually think that plastic is a material able to support a building; however, this new material proves that it's possible.

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New Material: Strong as Steel, Light as Plastic

This material is more potent than bulletproof glass and the force necessary to break it is twice higher than the one needed to break steel. This is despite the fact that this new material has only around a sixth of the density of steel.

The team achieved this by creating a new process for polymer formation. Plastic is a polymer, as well as glass and rubber. They wanted to discover if they could make a two-dimensional version of a polymer that would stay flat and thus, make it much lighter.

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This was a decade-long process that has been recently published in the *Nature* journal. Polymers are chains of individual molecules known as monomers and they're connected together by chemical bonds.

Normally, when there's a formation of polymers, they expand into 3D objects, similar to a cake rising as it bakes. The challenge is that even if one monomer starts to rotate, the polymer becomes 3D.

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Polymer Induction to Grow into 2D Sheets Help Form Lightweight, Potent Materials

Let's say you wanted to line up kids and pack several of them in an auditorium by linking their arms. If one of the kids decides to shift around, the order can't be kept.

The key was to build a process that can allow the linking up of the monomers to develop into a polymer chain, without any straying of the monomers.

Two-dimensional polymers can be layered like disks and plenty of them to be stacked into a bunch and into a small space, similar to the kids lined up into an auditorium if all of them behave well.

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Since the material is self-assembling, it can be produced in larger amounts by increasing the amount of the starting materials.

Until now, scientists thought it wasn't possible to induce polymers into the creation of 2D sheets. The team has filed for two patents on this process.

Their research was funded by the CENT at the Energy Frontier Research Center sponsored by the US DEOS and the Army Research Lab.

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Sources:

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