

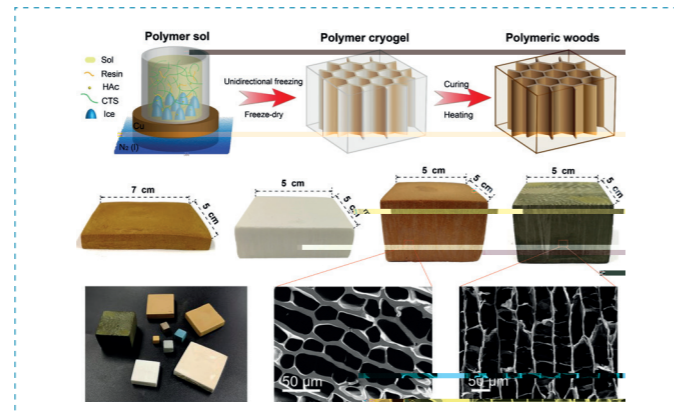
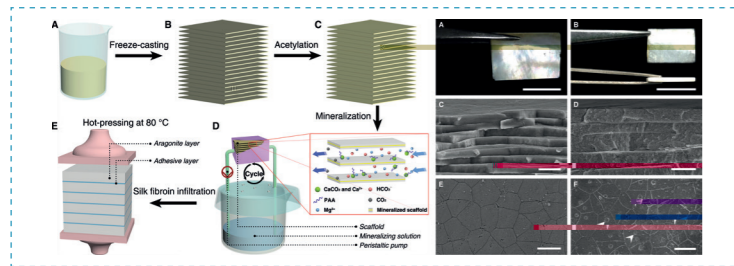
Yu Shuhong has been engaged in inorganic synthesis and biomimetic materials research. He has made a series of original achievements in the field of design, preparation and applications of bio-inspired engineering materials, laying a solid foundation for creation of practical bio-inspired structural functional materials and their applications.

A synthesis method called mesoscale "assembly and mineralization" was successfully established and the synthetic nacre was successfully mineralized for the first time, which solves this world-recognized problem. The lightweight and high-strength artificial wood with excellent heat insulation and fire prevention performance was created. The related research work was highlighted by the scientific media Science News and Scientific American. He explored the research on the preparation and functionalization of macroscale nanoassemblies with great potential applications. The massive production of various nanoscale building blocks and their assemblies have been successfully achieved by his team.

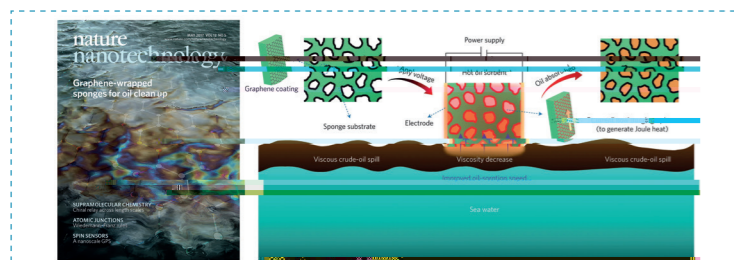
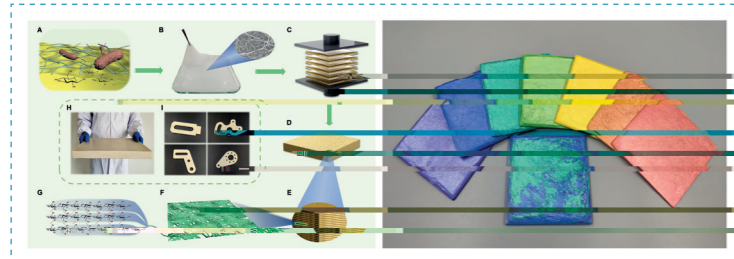


俞书宏

Scientific American



Artificial wood.



INSIGHTS
PERSPECTIVES
Growing a synthetic mollusk shell
Three-dimensional organic templates control calcium carbonate precipitation

The mineralization method managed by Ma et al. is a breakthrough because it successfully combines two critical steps: the fabrication of a large volume of a 3D multi-layered template of fibrous with controlled microscopic spacing between the layers, and the controlled mineralization of calcium carbonate up to very high mineral contents (93% volume fraction of calcium carbonate). The scaffold is formed in only a couple of weeks (compared with years for natural nacre). A silk fibroin, infiltrated at the interface between the layers, is used to control the mineralization process. The final material replicates many of the features of nacre, including its brick-and-mortar microstructure and the nanostructure of the individual mineral tablets. In terms of mechanical strength, the weak interface in the material defect cracks, which results in the synthetic nacre being about four to five times less "tough" than natural nacre (0.046 GPa vs 0.22 GPa). This fabrication method could serve as a "sandbox" with which to study the fundamental principles of mineralization in highly complex biological systems or by using different combinations of minerals and polymers as raw ingredients. This method could also be used to make large volumes of nacre-like bone grafts that would duplicate the mechanical and in vivo response of natural bone, an urgent challenge in orthopedic medicine. The method could also be used to make new "biomimetic" engineering materials. In particular, the controlled mineralization of calcium carbonate could also lead to many new "biomimetic" engineering materials. In particular, the controlled mineralization of calcium carbonate could also lead to many new "biomimetic" engineering materials. In particular, the controlled mineralization of calcium carbonate could also lead to many new "biomimetic" engineering materials.

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This synthetic wood is as strong as the real thing—and won't catch fire
By Robert F. Service | Aug. 10, 2018, 2:00 PM

The synthetic wood is as strong as the real thing—and won't catch fire. Science News highlights the work of artificial wood.

"This synthetic wood is as strong as the real thing—and won't catch fire"—Science News highlights the work of artificial wood.

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RESEARCH HIGHLIGHT | 01 April 2017
Hot graphene sponge mops up oil **Graphene heaters absorb faster**
CUI SPILL RECOVERY

Graphene heaters absorb faster. The synthetic material is made of a porous, interconnected network of graphene sheets that are coated with a thin layer of gold. The material is highly conductive and can be used to heat a variety of materials, including polymers and composites. The material is also highly flexible and can be used to create a variety of devices, including sensors and actuators.

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Materials science
Bulk production of mother-of-pearl
Nature 536, 377 (2016)
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Artificial mother-of-pearl is produced by mimicking the natural process of mineralization. Mother-of-pearl, or nacre, is remarkably strong yet biodegradable. However, its complex layered structure, in which mineral plates form in an organic scaffold, makes it difficult to recreate in bulk. Shuhong Yu at the University of Science and Technology of China in Hefei and his colleagues built their own matrix by growing sheets of ice, which squeezed a solution of the biopolymer chitosan into solid layers. They then pumped this scaffold with materials to grow calcium carbonate, and pressed the stack to form a synthetic nacre. The synthetic nacre is as strong as natural nacre and takes just two weeks to grow. This method could be used to produce materials for use in the aerospace industry or as armour, say the authors.

SCIENTIFIC AMERICAN
SLEEP LEARNING
Artificial Wood
The synthetic material is made of a porous, interconnected network of graphene sheets that are coated with a thin layer of gold. The material is highly conductive and can be used to heat a variety of materials, including polymers and composites. The material is also highly flexible and can be used to create a variety of devices, including sensors and actuators.

"Artificial Wood"—Scientific American highlighted the work

lacks its standard vulnerabilities to fire and water".