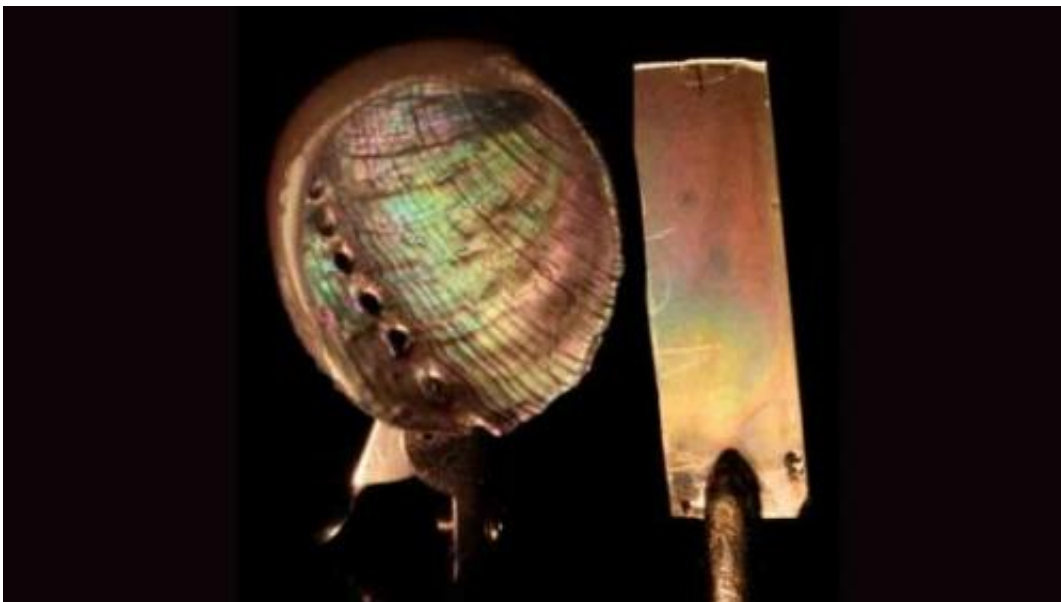


Researchers create artificial mother of pearl, pave way for tough coatings

July 24 2012



Mother of pearl next to artificial nacre Cavendish Laboratory

(Phys.org) -- Mimicking the way mother of pearl is created in nature, scientists have for the first time synthesised the strong, iridescent coating found on the inside of some molluscs. The research was published today in the journal *Nature Communications*.

Nacre, also called mother of pearl, is the iridescent coating that is found on the inside of some [molluscs](#) and on the outer coating of pearls. By recreating the biological steps that form nacre in molluscs, the scientists

were able to manufacture a material which has a similar structure, mechanical behaviour, and optical appearance of that found in nature.

In order to create the artificial nacre, the scientists followed three steps. First, they had to take preventative measure to ensure the [calcium carbonate](#), which is the primary component of nacre, does not crystallise when precipitating from the solution. This is done by using a mixture of ions and [organic components](#) in the solution that mimics how molluscs control this. The precipitate can then be adsorbed to surfaces, forming layers of well-defined thickness.

Next, the [precipitate](#) layer is covered by an organic layer that has 10-nm wide pores, which is done in a synthetic procedure invented by co-author Alex Finne more. Finally, [crystallisation](#) is induced, and all steps are repeated to create a stack of alternating crystalline and organic layers.

Professor Ulli Steiner, of the Department of Physics' Cavendish Laboratory at the University of Cambridge, said: "Crystals have a characteristic shape that reflects their atomic structure, and it is very difficult to modify this shape. Nature is, however, able to do this, and through our research we were able to gain insight into how it grows these materials. Essentially, we have created a new recipe for mother of pearl using nature's cookbook."

Alex Finne more, also of the Department of Physics' Cavendish Laboratory, said: "While many composite engineering materials outperform nacre, its synthesis entirely at [ambient temperatures](#) in an aqueous environment, as well as its cheap ingredients, may make it interesting for coating applications. Once optimised, the process is simple and can easily be automated."

More information: The paper 'Biomimetic Layer-by-Layer Assembly of Artificial Nacre' will be published in the 25 July edition of *Nature*

Communications.

Provided by University of Cambridge

Citation: Researchers create artificial mother of pearl, pave way for tough coatings (2012, July 24) retrieved 7 August 2024 from

<https://phys.org/news/2012-07-artificial-mother-pearl-pave-tough.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.