

U-M team makes synthetic mother of pearl

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It's possible to grow thin films of mother of pearl in the laboratory that are even stronger than the super-strong material that naturally lines the inside of abalone shells. The trick is to add compounds normally found in insect shells and fungi cell walls to the recipe.

Materials scientists have long been fascinated by mother of pearl, also known as nacre, (NACK-er) because it is several times stronger than nylon, said Nicholas Kotov, associate professor at the U-M College of Engineering. Kotov's team has now succeeded in making artificial nacre.

"We think this material will be tremendously important because different sensors, different electronic materials, space shuttles, airplanes and even cars require thin sheets of ultra-strong material," said Kotov.

"Additionally, we can engineer now, on a very accurate basis, the mechanical properties of the composites that we make."

Seeking a way to strengthen the artificially made nacre, researchers substituted in a material called chitosan, which is a naturally occurring compound in insect shells and the cell walls of fungi.

The nanocomposite films are made by layering molecules on top of each other. Scientists dip a substrate into a solution of electrolytes, which carries electrical current, then into a clay solution. During this process, molecules bind to the substrate and begin to form layers. The dipping is done in a specific sequence to control different properties of the film as it is layered.

"As we build up the film, we can change its structure and therefore

change the mechanical and other properties," said Kotov.

Source: University of Michigan

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