

Self-Healing: Sunlight Helps Scratches on Cars, Electronics and Furniture Disappear

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Will the iPod be able to heal itself of scratches? Image source: Goldmund100 via Wikimedia Commons

(PhysOrg.com) -- There are few things in life that are more annoying than having your iPod's beautiful face marred by scratches. But what if those scratches could "heal" themselves? New technology developed at the University of Southern Mississippi could lead to just that situation. And it would work on more than just your handheld music device: Scratches on furniture and cars could disappear as well.

It isn't magic, though. In order to protect your merchandise from scratches, it would be necessary to coat them with a special polyurethane treatment. The [coating](#) is clear, and its special properties are derived from chitosan. Chitosan is the material that makes the exoskeletons of such creatures as crustaceans and insects hard. The chitosan is combined with oxetane. Oxetane is ring-

shaped -- and unstable. This becomes important for the healing of scratches.

When something scratches the coating, the oxetane ring is broken. The reactive ends of the broken rings are eager to re-bond to something. The ultraviolet rays of the sun act as an activation mechanism for the chitosan. The chitosan binds the molecule fragments together, closing the ring again and helping the scratch to "heal". The scratch appears to have disappeared, leaving the surface smooth once more. The process takes about half an hour in natural [sunlight](#).

This new advance is significant because creating non-living coatings that can repair themselves is tricky work. From expandable gel to nanoparticles, the quest for a coating that heals its own scratches has come up short. The latest attempt, though, seems a little more promising. It combines natural sunlight with a substance that occurs naturally in nature. Bio-mimicry continues to provide interesting answers to perplexing problems of science and technology, and the use of chitosan as part of a self-healing polymer is another example.

The coating isn't quite ready for commercial use, however. There is no answer to what happens when a second scratch is made over the position of the first scratch. And what happens if you have intersecting scratches? Nevertheless, there is tremendous potential for this coating.

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