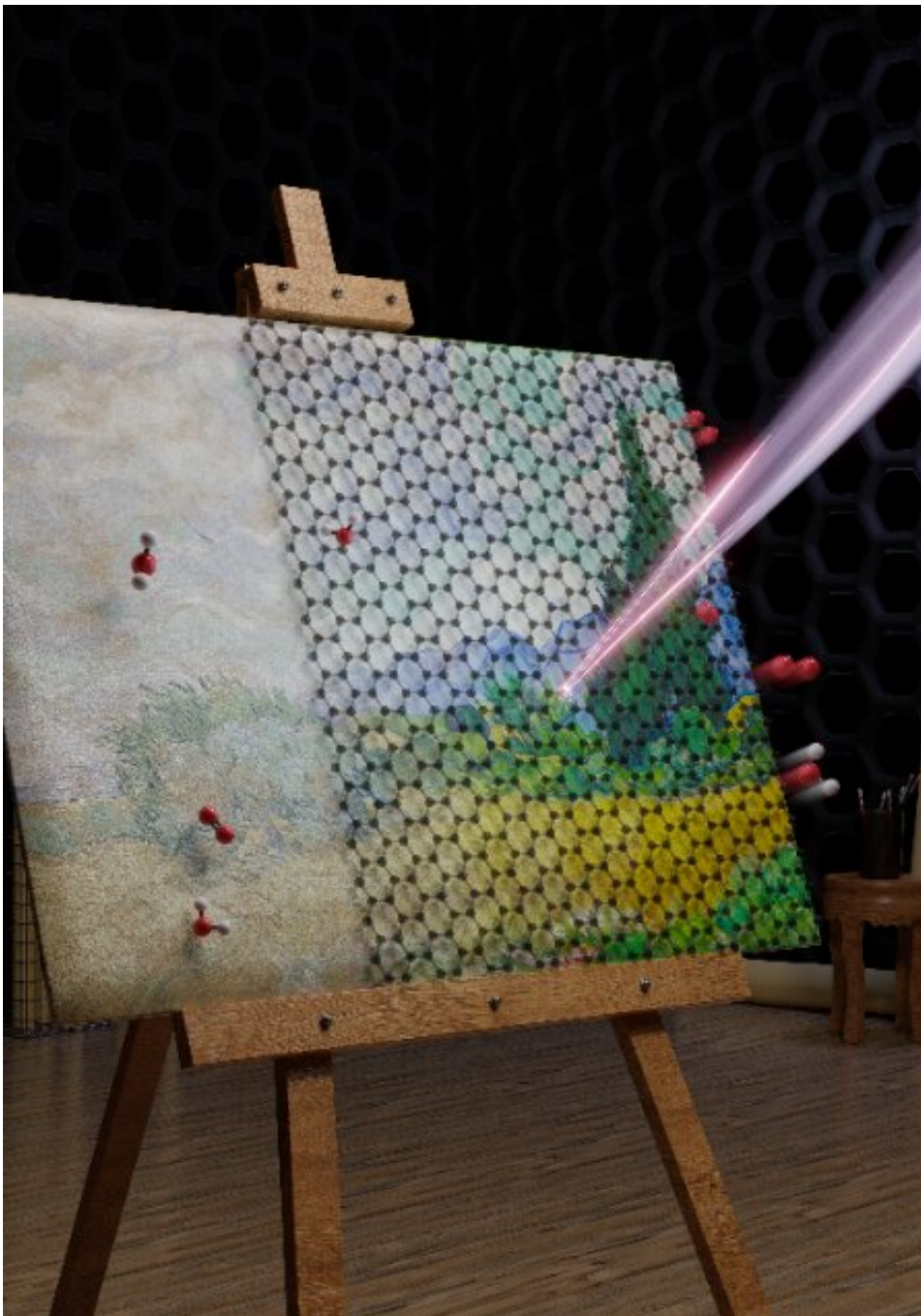


# **Graphene for the protection of paintings: paving the way for novel methods in art preservation and restoration**

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The exposure of colors used in artworks to ultraviolet (UV) and visible light in the presence of oxidizing agents triggers color degradation,

fading and yellowing. These degradation mechanisms can lead to irreversible alteration of artworks. Protective varnishes and coatings currently used to protect art paintings are not acceptable solutions, since their removal requires the use of solvents, which can affect adversely the underlying work surface.

A team of researchers from the Institute of Chemical Engineering Sciences of the Foundation for Research and Technology-Hellas (FORTH/ ICE-HT), the Department of Chemical Engineering of the University of Patras, and the Center for Colloid and Surface Science (CSGI) of the University of Florence, led by Professor Costas Galiotis, had the innovative idea to use [graphene](#) veils for the protection of paintings against environmental degradation.

Isolated in 2004 by Geim and Novoselov from the University of Manchester (Nobel Prize in Physics in 2010), graphene has exceptional properties that have already been used in many applications and products. The graphene veil used in this work is a flexible, transparent film produced by the technique of chemical vapor deposition. It has a monoatomic thickness and, since there are no size limitations in the other dimensions (length and width), it can cover any required large surface areas.

The results from measurements performed in the above mentioned laboratories, showed that this membrane is impermeable to moisture, the oxidizing agents and other harmful pollutants and also can absorb a large amount of harmful ultraviolet radiation. Finally, in contrast to other protective means, it is demonstrated that these graphene coatings are relatively easy to remove without damaging the [surface](#) of the artworks.

This research was published in *Nature Nanotechnology*.

**More information:** M. Kotsidi et al, Preventing colour fading in

artworks with graphene veils, *Nature Nanotechnology* (2021). [DOI: 10.1038/s41565-021-00934-z](https://doi.org/10.1038/s41565-021-00934-z)

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