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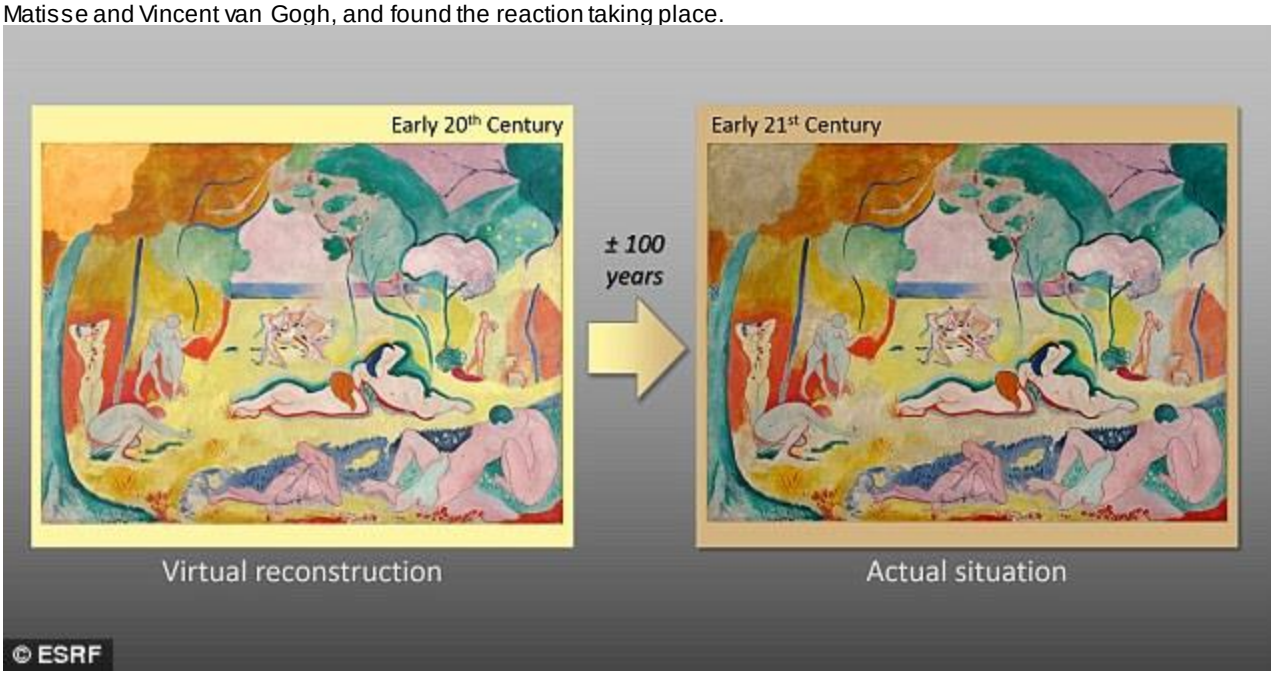
Fading beauty of Matisse and van Gogh's masterpieces: Chemical reaction is turning famous paintings BROWN

- **The discovery was made by the European Synchrotron Radiation Facility**
- **They found that the cadmium yellow pigment is reacting with sunlight**
- **This causes it to degrade to another compound that is beige**
- **Effect is that yellows in paintings are gradually losing their vibrant colour**

When painted 100 years ago their colours were fresh and vibrant, but now many famous masterpieces have seen their yellows turn to brown.
Scientists have pinpointed a chemical reaction that is making their yellows lose their hue.
Researchers analysed various impressionist, post-impressionist and early modernist painters including Henri Matisse and Vincent van Gogh, and found the reaction taking place.



The discovery was made by the European Synchrotron Radiation Facility. They found that the cadmium yellow pigment is reacting with sunlight. This causes it to degrade to another compound that is beige. Shown is Matisse's The Joy of Life painting before (left) and after (right) the effect.

The scientists from the European Synchrotron Radiation Facility (ESRF) in France found that a certain pigment - cadmium yellow - was reacting with sunlight and degrading to another compound that is beige.

The reaction can even make the paint fall off the canvas.

Paintings such as 'The Joy of Life' by French artist Matisse and 'Flowers in a Blue Vase' by Dutch painter van Gogh have been particularly badly affected.

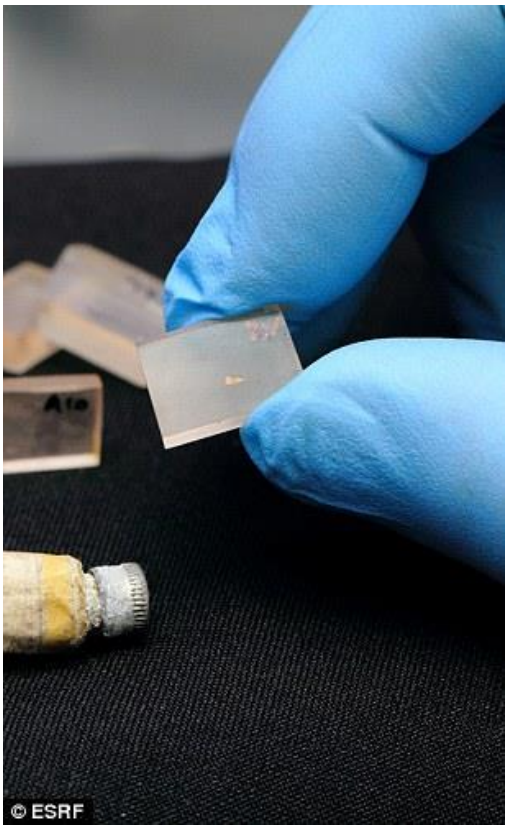
Using X-rays and high-powered microscopes, the scientists took paint flakes from several paintings by Matisse, van Gogh and Belgian painter James Ensor to make the findings.

Cadmium first began to be used by painters to produce yellow from the 1800s onwards.

Before, a form of paint made from lead and antimony called 'Naples Yellow' had been used.

They found that cadmium yellow - the chemical calcium sulphide - had changed after contact with sunlight to cadmium sulphate.

Humidity in the air can cause the new compound, cadmium sulphate, to dissolve in water.



Flowers in a Blue Vase by Vincent van Gogh (left) was also found to experience the effect, and may once have been more yellow. On the right are some of the paint samples being studied

The ESRF (the 'ring' pictured centre) in Grenoble, France is a large-scale international research instrument. It is the world's most intense source of X-rays. The extremely bright light that the ESRF provides to scientists from around the globe enables them to explore matter in many disciplines.

Koen Janssens, chemistry professor at the University of Antwerp said: ‘As a chemist I find it striking that in paintings of different artists and different geographical origins that presumably were conserved for circa 100 years in various museum conditions, very similar chemical transformations are taking place.
‘This will allow us to predict with higher confidence what may be happening to these works of art in coming decades.’
Jennifer Mass, head of the research team at the Winterthur Museum in Delaware added: ‘While the damage that has occurred to the cadmium yellow paint cannot currently be reversed, the current study has pointed the way to several important areas that require investigation.’
She said their techniques could in future help prevent paintings changing colour before the results are visible to the human eye - and place them in conditions that will stop them worsening.
The results will also allow museums and galleries to better control humidity and light levels to slow down or stop the chemical transformations.