

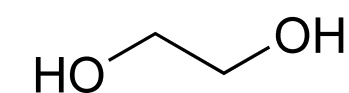
EXAMEN : BACCALAURÉAT GÉNÉRAL	SESSION 2011
ÉPREUVE : Évaluation spécifique de langue en section européenne	
PHYSIQUE-CHIMIE en langue ANGLAISE	SUJET N°4

Safer sunscreens

Coating titania nanoparticles with carbon could result in a safer UV filter to be used in sunscreen, say Italian scientists.

Long-term exposure to UVA and UVB radiation from sunlight can cause wrinkles, damaged skin and, in some cases, skin cancer. Titania (TiO_2), one of the main components in sunscreens, can absorb and scatter UVA and UVB radiation. However, titania can also become reactive under UV rays and in contact with water, generating free radicals that cause skin damage.

Now, Ivana Fenoglio and Stefano Livraghi's teams from the University of Torino in collaboration with the Institute for Health and Consumer Protection, Ispra, have modified the surface of titania nanoparticles to decrease their reactivity under UV.



Ethylene glycol

The groups coated the nanoparticles with ethylene glycol and heated the resulting compound to 300°C to carbonise it. They found that this reduced the nanoparticles' oxidative power and consequently decreased free radical formation. (...)



'To use titania particles for skin care, a delicate balance is needed to prevent formation of reactive oxygen species, which have been suspected to cause skin damage, without affecting the desirable optical properties,' says Sefik Suzer, an expert in inorganic nanoparticles (...). 'This research will undoubtedly help in developing a new generation of cosmetic products as well as leading to formulation of new routes for special applications of titania.'

'This research may be a starting point for setting up protocols to produce UV filters that may find applications in different fields including the cosmetics industry,' says Fenoglio.

Lorena Tomas Laudo, Royal Society of Chemistry, 17 November 2010

Questions:

1. Present and comment this document.
2. Do not forget to focus on at least one physics and/or chemistry topic as for example the properties of waves and especially of UV waves.
3. What do you know about other types of waves and their applications or drawbacks?