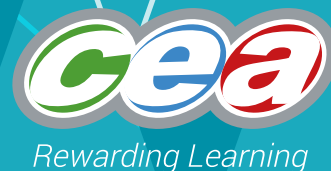


FACTFILE: GCSE DAS CHEMISTRY: UNIT 1.4



Nanoparticles

Learning outcomes

1.4.1 demonstrate knowledge and understanding that nanoparticles are structures that are 1-100 nm in size and contain a few hundred atoms;

1.4.2 evaluate the benefits of nanoparticles in sun creams, including better skin coverage and more effective protection from the Sun's ultraviolet rays, and the risks, such as potential cell damage in the body and harmful effects on the environment.

What is a nanoparticle?

A nanoparticle is a structure that is 1-100 nm in size and contains a few hundred atoms.

One nanometer is 0.000 000 001 m (1×10^{-9} m)

Use of nanoparticles in sun creams

Sun creams protect against sunburn by absorbing some of the sun's ultraviolet radiation. Many contain zinc oxide to absorb the uv radiation but is difficult to rub in. Nanoparticles of zinc oxide are now often used in sun creams and have several benefits:

- they give better skin coverage to the sun cream;
- they give more effective protection from the sun's ultraviolet rays;
- they are clear and colourless which makes the sun cream invisible on the skin;
- they do not degrade on exposure to the sun.

Nanoparticles also have the following risks:

- potential cell damage in the body – the nanoparticles are so small they may be able to penetrate cell membranes, or be breathed in. In the body they may be more reactive or more toxic than the bulk material;
- harmful effects on the environment.

Questions

1. What are nanoparticles?

[1]

2. State two benefits of using nanoparticles in sun creams.

[2]

3. State two risks of using nanoparticles in sun creams.

[2]

4. How many atoms are approximately present in a nanoparticle of silver?

[1]

