

Nanoparticles Notes

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Nanoparticles: material consisting of a few hundred atoms and between 1 nm and 100 nm in size. Nanoparticles are larger than atoms and simple molecules.

$$1 \text{ nm} = 1 \times 10^{-9} \text{ m}$$

Properties of Nanoparticles

Nanoparticles are used as they have a **very large surface area to volume ratio**. This means, as they are so small, there is a lot of surface and not a lot inside of them. A substance that is made up of nanoparticles is called a nanoparticulate.

Uses of Nanoparticulate Materials

Nanoparticulate materials have many uses. These include:

1. As ingredients in cosmetics, deodorants and sunscreens.
2. In electronic circuits and as catalysts.

Exam note: The most commonly assessed use at GCSE is sunscreens.

Sunscreens contain titanium dioxide nanoparticulate. This is transparent and absorbs harmful ultraviolet radiation from the sun.

Possible Risks of Using Nanoparticles

1. Some people are concerned that the small size of nanoparticles makes it possible to breathe them in, or for them to pass into cells.
2. Once inside the body, they might catalyse reactions that are harmful.
3. Toxic substances could bind to them because of their large surface area to volume ratios, harming health if the nanoparticles do get into the body. Modern nanoparticulate materials have only become common recently, so it is difficult for scientists to determine their risks.