**Nanomaterial**

Nano material can be defined as material with an average grain size less than 100 nano meter.

Nano material have an extreamly small size which having atleast one dimension 100nm

One million nano meter equl to 1 meter

INTRODUCTION

1. a material having particles or constituents of nanoscale dimensions, or one that is produced by nanotechnology.

meant by nano materials

Nanomaterials are **chemical substances or materials that are manufactured and used at a very small scale**. ... ISO (2015) defines a nanomaterial as a: 'material with any external dimension in the nanoscale (size range from approximately 1 – 100 nm) or having internal structure or surface structure in the nanoscale'.

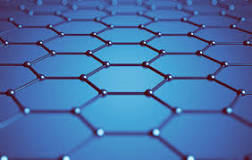
are examples of nano materials?

[[](https://www.google.com/search?q=What+are+examples+of+nano+materials?&tbm=isch&source=iu&ictx=1&vet=1&fir=4cM6DZq4vjT-QM,-CKh8GQS3KngaM,_&usg=AI4_-kRkTxqtCEoSQ35pVWblKyPDd845SQ&sa=X&ved=2ahUKEwii5JS_w8T1AhVYsFYBHVPgDNUQ9QF6BAgJEAE#imgrc=4cM6DZq4vjT-QM)](https://www.google.com/search?q=What+are+examples+of+nano+materials?&tbm=isch&source=iu&ictx=1&vet=1&fir=4cM6DZq4vjT-QM%252C-CKh8GQS3KngaM%252C_&usg=AI4_-kRkTxqtCEoSQ35pVWblKyPDd845SQ&sa=X&ved=2ahUKEwii5JS_w8T1AhVYsFYBHVPgDNUQ9QF6BAgJEAE" \l "imgrc=4cM6DZq4vjT-QM)

**Nanomaterial examples**

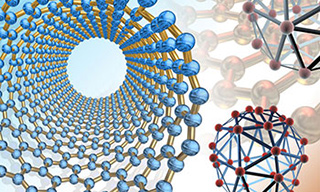
* Titanium dioxide.
* Silver.
* Synthetic amorphous silica.
* Iron oxide.
* Azo pigments.
* Phthalocyanine pigments.

What are the nano materials and how are they made

[[](https://www.google.com/search?q=What+are+the+nano+materials+and+how+are+they+made?&tbm=isch&source=iu&ictx=1&vet=1&fir=flmlxfL7wbTp0M,_skYMY6MZUAMNM,_&usg=AI4_-kQTtb3_XMkGqWO8FFiiy4EjNCkhlg&sa=X&ved=2ahUKEwii5JS_w8T1AhVYsFYBHVPgDNUQ9QF6BAgKEAE#imgrc=flmlxfL7wbTp0M)](https://www.google.com/search?q=What+are+the+nano+materials+and+how+are+they+made?&tbm=isch&source=iu&ictx=1&vet=1&fir=flmlxfL7wbTp0M%252C_skYMY6MZUAMNM%252C_&usg=AI4_-kQTtb3_XMkGqWO8FFiiy4EjNCkhlg&sa=X&ved=2ahUKEwii5JS_w8T1AhVYsFYBHVPgDNUQ9QF6BAgKEAE" \l "imgrc=flmlxfL7wbTp0M)

Nanomaterials can occur naturally, be **created as the by-products of combustion reactions**, or be produced purposefully through engineering to perform a specialised function. These materials can have different physical and chemical properties to their bulk-form counterparts.

### Introduction



**What are nanomaterials?**

Scientists have not unanimously settled on a precise definition of nanomaterials, but agree that they are partially characterized by their tiny size, measured in nanometers. A nanometer is one millionth of a millimeter - approximately 100,000 times smaller than the diameter of a human hair.

Nano-sized particles exist in nature and can be created from a variety of products, such as carbon or minerals like silver, but nanomaterials by definition must have at least one dimension that is less than approximately 100 nanometers. Most nanoscale materials are too small to be seen with the naked eye and even with conventional lab microscopes.

Materials engineered to such a small scale are often referred to as engineered nanomaterials (ENMs), which can take on unique optical, magnetic, electrical, and other properties. These emergent properties have the potential for great impacts in electronics, medicine, and other fields. For example,

1. Nanotechnology can be used to design pharmaceuticals that can target specific organs or cells in the body such as cancer cells, and enhance the effectiveness of therapy.
2. Nanomaterials can also be added to cement, cloth and other materials to make them stronger and yet lighter.
3. Their size makes them extremely useful in electronics, and they can also be used in environmental remediation or clean-up to bind with and neutralize toxins.

However, while engineered nanomaterials provide great benefits, we know very little about the potential effects on human health and the environment. Even well-known materials, such as silver for example, may pose a hazard when engineered to nano size.

Nano-sized particles can enter the human body through inhalation and ingestion and through the skin. Fibrous nanomaterials made of carbon have been shown to induce inflammation in the lungs in ways that are similar to Asbestos .



**Where are nanomaterials found?**

Some nanomaterials can occur naturally, such as blood borne proteins essential for life and lipids found in the blood and body fat.  Scientists, however, are particularly interested in engineered nanomaterials (ENMs), which are designed for use in many commercial materials, devices and structures.  Already, thousands of common products-- including sunscreens, cosmetics, sporting goods, stain-resistant clothing, tires, and electronics—are manufactured using ENMs. They are also in medical diagnosis, imaging and drug delivery and in environmental remediation.

**What are some of the main take-home points that NIEHS want people to know about nonmaterials? ((National Institute of Environmental Health Sciences)**

There are three main take-home points:

* **There is no single type of nanomaterial.** Nanoscale materials can in theory be engineered from minerals and nearly any chemical substance, and they can differ with respect to composition, primary particle size, shape, surface coatings and strength of particle bonds. A few of the many examples include  nanocrystals, which are composed of a [quantum dot](https://en.wikipedia.org/wiki/Quantum_dot) surrounded by semiconductor materials, nano-scale silver, dendrimers, which are repetitively branched molecules, and fullerenes, which are carbon molecules in the form of a hollow sphere, ellipsoid or tube.
* **The small size makes the material both promising and challenging.**  To researchers, nanomaterials are often seen as a "two-edged sword." The properties that make nanomaterials potentially beneficial in product development and drug delivery, such as their size, shape, high reactivity and other unique characteristics, are the same properties that cause concern about the nature of their interaction with biological systems and potential effects in the environment. For example, nanotechnology can enable sensors to detect very small amounts of chemical vapors, yet often there are no means to detect levels of nanoparticles in the air—a particular concern in workplaces where nanomaterials are being used.
* **Research focused on the potential health effects of manufactured nano-scale materials is being developed, but much is not known yet.** NIEHS is committed to developing novel applications within the environmental health sciences, while also investigating the potential risks of these materials to human health.

**Why is NIEHS involved in nanotechnology?**

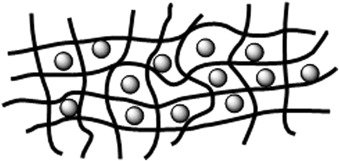
**NIEHS has two primary interests in the field of nanotechnology: harnessing the power of engineered nanomaterials to improve public health, while at the same time understanding the potential risks associated with exposure to the materials.**

**Fibre-reinforced plastic ( FRP)**

is a composite material made of a polymer matrix ...

**polymer matrix**

Polymer matrix is **the continuous phase in the composites used to hold the reinforcing agent in its place**, and its properties determine most of the degradative processes (delamination, impact damage, chemical resistance, water absorption, and high-temperature creep).



What is fiber reinforced plastic used for?

Fibre reinforced polymer (FRP) are composites used in almost every type of **advanced engineering structure**, with their usage ranging from aircraft, helicopters and spacecraft through to boats, ships and offshore platforms and to automobiles, sports goods, chemical processing equipment and civil infrastructure

**Types of Fibre Reinforced Polymer (FRP)**

* Glass Fibre Reinforced Polymer (GFRP) Ad. Glass fibres are basically made by mixing silica sand, limestone, folic acid and other minor ingredients. ...
* Carbon Fibre Reinforced Polymer (CFRP) Ad. ...
* Aramid Fibre Reinforced Polymer (AFRP) Aramid is the short form for aromatic polyamide.

