

Introduction to Nanotechnology

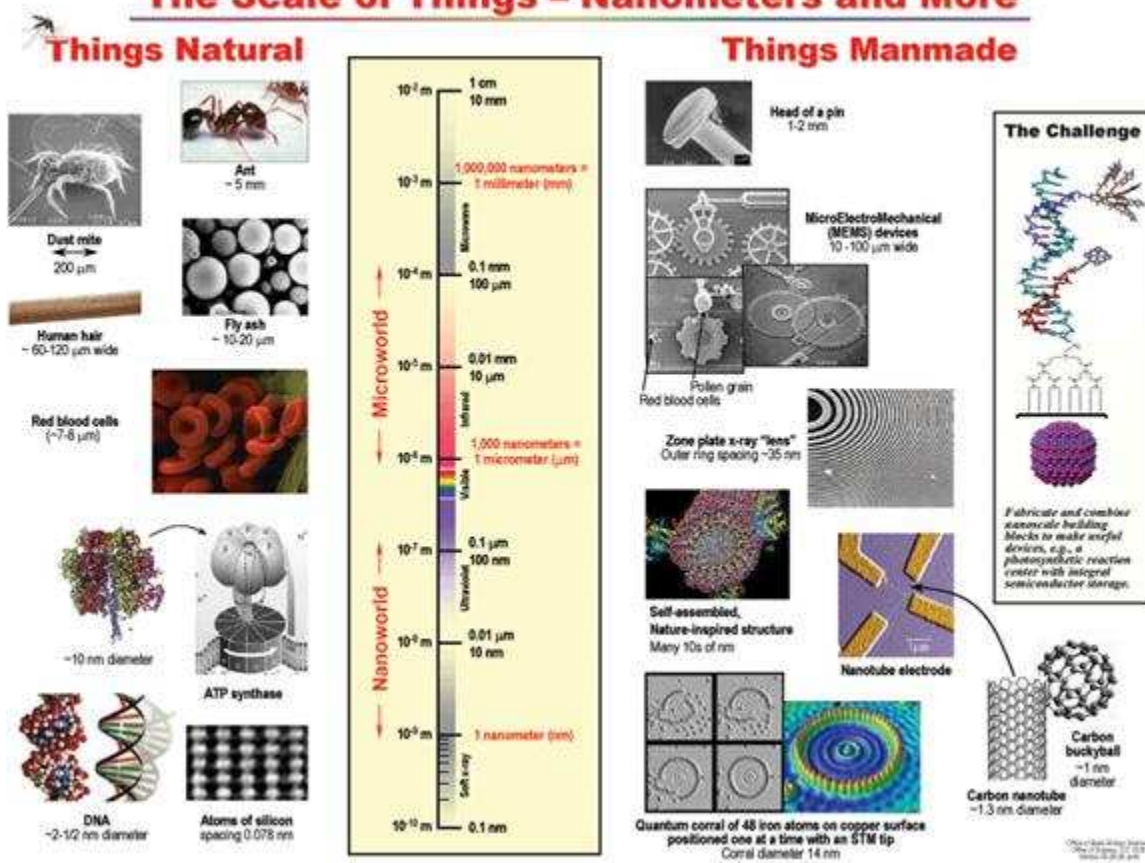
Nanotechnology is defined as the study and use of structures between 1 nanometer and 100 nanometers in size. To give you an idea of how small that is, it would take eight hundred 100 nanometer particles side by side to match the width of a human hair.

Introduction to Nanotechnology: Looking At Nanoparticles

Scientists have been studying and working with nanoparticles for centuries, but the effectiveness of their work has been hampered by their inability to see the structure of nanoparticles. In recent decades the development of microscopes capable of displaying particles as small as atoms has allowed scientists to see what they are working with.

The following illustration titled “The Scale of Things”, created by the U. S. Department of Energy, provides a comparison of various objects to help you begin to envision exactly how small a nanometer is. The chart starts with objects that can be seen by the unaided eye, such as an ant, at the top of the chart, and progresses to objects about a nanometer or less in size, such as the ATP molecule used in humans to store energy from food.

The Scale of Things – Nanometers and More



Now that you have an idea of how small a scale nanotechnologists work with, consider the challenge they face. Think about how difficult it is for many of us to insert thread through the eye of a needle. Such an image helps you imagine the problem scientists working with nanoparticles that can be as much as one millionth the size of the thread. Only through the use of powerful microscopes can they hope to 'see' and manipulate these nano-sized particles.

Introduction to Nanotechnology Applications

The ability to see nano-sized materials has opened up a world of possibilities in a variety of industries and scientific endeavors. Because nanotechnology is essentially a set of techniques that allow manipulation of properties at a very small scale, it can have many applications, such as the ones listed below.

The properties of familiar materials are being changed by manufacturers who are adding nano-sized components to conventional materials to improve performance.

For example, some clothing manufacturers are making water and stain repellent clothing using [nano-sized whiskers](#) in the fabric that cause water to bead up on the surface.

How can nanotechnology improve fabric?

Making composite fabric with nano-sized particles or fibers allows improvement of fabric properties without a significant increase in weight, thickness, or stiffness as might have been the case with previously-used techniques.

Fabric Care Instructions for best Performance

- Machine wash warm
- No bleach
- Good rinse to remove left over detergent/impurities.
- Fabric softener not recommended
- Wash darks separately / wash with like colours
- Tumble dry medium for min. 45 min/temp. 155.F
- For best performances, please ensure that the garment is dried thoroughly and removed promptly
- Iron desired
- For best Performance, dry cleaning is not recommended

Gentlemen, breathe easy!

- Spills will now be a thing of the past. Or, at least, they wouldn't do much to your shirt. Nano shirt come with Nano Fabric technology.
 - Simply put, Nano Fabric shirt with special Nano chemical application forms a layer that prevents liquids to seep in. Simply put, you can relax when a spill threatens to spoil your shirt.
 - The nano shirt doesn't age. They are wrinkle resistant and retain the look wash after wash. Go ahead, enjoy the fab life!

Wash with care

- Machine wash warm
- No bleach
- Rinse well to remove left over detergent/impurities
- Avoid fabric softener & dry cleaning
- Wash dark shades separately
- Tumble dry medium for min. 45 min/temp 155F
- Look your best everyday

Liquid Repellent-Wrinkle Resistant-Breathable

- Nano-Fabric has been made with Special nano chemical application to the fabric which forms molecular structures around the cotton fibers. This creates an invisible barrier for moisture & prevents absorption.
- Nano Fabric is wrinkle resistant, without changing the way it looks & feels.
- Nano Fabric brings to the market, a family of products designed to give ease of care and superior performance to everyday fabrics.
- Nano Technology takes fabric expectations to new level, creating performance that lasts for long.

Fabrics :

Nanotechnology in Fabrics

Nanotechnology used for making composite fabric with NANO-sized particles or fibers which allows improvement of fabric properties without a significant increase in weight, thickness, or stiffness. The technology used is a NANO particle coating, similar to the one already used to keep windows clear. The coating, which is non-toxic, can be permanently bonded to the fiber and does not alter its texture and feel.

Besides the convenience and usefulness, this is also a wonderful environmental advance, as self-cleaning technology will help in reducing the consumption of chemicals, such as detergents and dry-cleaning solvents, water, and energy.

Nanotechnology may help turn fabrics into lightweight batteries.

Some of the features of NANO fabrics :

- Stains are allowed to wash out easily
- Natural absorbency retained
- Long lasting protection for fabrics
- Natural softness retained
- Nanotechnology builds permanent spill and stain resistance into the fiber structure
- Retaining fabrics natural softness as Nanotechnology resist spills and keeps stains from soaking in
- Nanotechnology used on cotton fabrics moves moisture away from the skin and isolates it on the outer surface of fabrics. This helps to get rid of heavy, wet feeling when you are at work.
- You can move easily from hot to cold environments, still you feel dry due to the technology used on fabrics
- Nano fabrics dries more faster than any other fabrics

NANO Fabrics India uses molecular level technology to make NANO fabrics. These NANO fabrics has specialty to resist spills, repel stains, absorb water, perspiration, etc. without harming fabrics and its comfort.

Now a day's many of well known brands are using NANO fabrics technology. NANO fabrics are very very useful at home as home is the place where spills & stains are most common. Using NANO Fabrics you will get cleaner and fresher home textiles for a longer period.

NANO Fabrics India protects your home textiles by using NANO technology, it is the soft and durable applications which provides correct balance of comfort and performance. NANO Fabrics India has given solutions that resist spills, repel stains, and keep you static-free.

A composite is a material that combines one or more separate components. Composites are designed to exhibit the best properties of each component. One of the most challenging aspects of current research is to obtain an even and thorough dispersion of the nanomaterial within the composite.

Nanocomposite fibers are produced by dispersing nanosize fillers into

a fiber matrix. Nanofillers can be distributed in a polymer matrix through either a mechanical or chemical process. Common fillers include nanoparticles, graphite nanofibers (GNF) or carbon nanotubes (CNT) into a fiber matrix. Depending on the kind of nanomaterial used and the amount and distribution of the nanomaterial—the mechanical, electrical, optical or biological properties of the textile can be altered.

Nanoparticles



Nano fabrics (*Image provided by Nano Fabrics India)

What kind of chemicals are used in the manufacturing process? Is there any risk of skin allergies? No skin allergies at all.

Nanoparticles include clay, metal oxides and carbon black. Although some of these materials have been utilized in the textile industry for decades, reducing them to the nanosize is recent and has resulted in fibers with better performance properties than in the past.

Clay nanoparticles are resistant to heat, chemicals and electricity, and have the ability to block UV light. Incorporating clay nanoparticles into a textile can result in a fabric with improved tensile strength, tensile modulus, flexural strength and flexural modulus.

Nanocomposite fibers which utilize clay nanoparticles can be engineered to be flame, UV light resistant and anti-corrosive.

Producing flame resistant fabric has been an ongoing challenge in the textile industry. If untreated, synthetic fibers melt and drip when exposed to high heat. Although there have been a number of flame retardant finishes available since the 1970's, the emission of toxic gasses when set ablaze make them somewhat hazardous. Clay nanoparticles have been incorporated into nylon to impart flame retardant characteristics to the textile without the emission of toxic gas.