

NANOTECHNOLOGY

What is it?

What Does it Mean to Our World?

NANOTECHNOLOGY — best described as the “science of small things” — involves research and technology development at the atomic, molecular and macromolecular levels.

Nano, derived from the Greek word for dwarf, looks at matter between 1 and 100 nanometers. A nanometer is a billionth of a meter – barely the size of 10 hydrogen atoms in a row. How small is a nano? To put this in a more understandable perspective, a human hair generally measures 80,000 nanometers across.

In the nano world, researchers have concluded that matter at this level reacts very differently. Materials broken down into nanoparticles can increase their surface areas, often by a factor of millions. The materials become significantly more reactive, faster to ignite or melt, and quicker to absorb.

Today, researchers work to develop new nanotechnology applications across a wide range of industries, such as biopharmaceuticals, therapeutics, advanced materials, agriculture, chemicals, electronics, energy, defense and transportation. Some of the dramatic results:

- Wrinkle-free, stain resistant clothing and fabrics
- Tennis balls, and eventually tires, that retain bounce longer
- Anti-bacterial and self-healing bandages
- Scratch and wear-resistant paints and coatings
- Film coatings to make eyeglasses more scratch resistant
- Portable labs to provide instant analysis – from diabetes to HIV
- Implantable health monitors and ultra precise nano drug agents
- Windows that are self-cleaning
- Vehicle bumpers that are stronger and more resistant to dents and scratches

Nanotechnology researchers are also working on even more futuristic applications like tiny robots that can travel through the human body combating disease and other ailments. Other future potential applications include solar cells that are inexpensive and easy to apply, devices that will clean heavy metals from the environment, electronic books that are as easy to carry as a newspaper, and bullet-proof battle suits that can stiffen to provide splints for broken bones.

