

## Seven Great Influences of Nanotechnology on Products



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At present, there are numerous products in the market, in which nanotechnology has been used. This technology improves products in various manners. Seven different approaches that are used in the production of nanoproducts have been discussed hereafter.

After two decades of nanotechnology development, some aspects of this technology have passed the research phase and become commercialized. Many applications of nanotechnology in life can be found by studying products in the markets. This technology has improved some products and has created new products too. In this article, seven great influence of nanotechnology on products in the market have been discussed.

### **1- Decreasing weight and increasing strength**

Strengthening structure of materials such as plastic, steel, concrete, and even fabrics by using nanotechnology increases the strength while decreases the weight of products. Nanoparticles, nanotubes, and nanofibers can be considered the most important option to strengthen the structure of composites. Companies active in manufacturing of automobiles, airplanes, construction industry, and paint industry look for this advantage of nanotechnology.

### **2- Decreasing size and reducing energy consumption**

The global trend in the production of electronic devices is in a way that producers seek to reduce the size of equipment and to increase speed and efficiency at the same time. Therefore, companies work on the implementation of nanostructures such as carbon nanotubes and nanowires as the connector in various electrical devices. Nanotechnology has also decreased the size of chips, and companies work on putting unlimited number of transistors on a chip by using nanotechnology. As the size decreases, the amount of energy consumption can be decreased too. Nanocomposites and nano-alloys are being produced in

order to absorb heat created in the small space.

### **3- Improving efficiency**

In many products such as monitors, nanotechnology has taken the place of common technologies, resulting in an improvement in the of the product. TVs containing quantum dots have been presented to the market, which have a great difference in the number and accuracy of colors in comparison with the previous technology. Adding nanomaterials to surfaces such as glass or fabrics creates new behaviors such as self-cleaning, which improves the efficiency of the existing products. Nano-fertilizers in agriculture industry have succeeded in increasing the amount of product in a specific area.

### **4- Making smart**

One of the most important achievements of nanotechnology in industrial products is to make them smart. Nanostructures can cause certain behavior in products. As an example, mention can be made of nanopolymers sensitive to pH, photomechanic materials (which change in form under radiation), dielectric elastomers (which change in form under external factors such as electric field), and self-repairing materials.

### **5- Medical revolution**

Many challenges in the medical world can be solved through nanotechnology. Drug nano-carriers, contrast imaging compounds, nano-robots, and nanosensors are among these materials. Nanotechnology has also improved diagnosis devices, which results in the early diagnosis of diseases.

### **6- Decreasing costs**

Sustainable energies are usually obtained at high price with low efficiency. Nanotechnology has decreased the cost of production of sustainable energies in the recent years. It has been realized by decreasing the cost of production of solar cells, high capacity batteries, supercapacitors with high stability, and presentation of cheaper methods to produce hydrogen from water.

### **7- Improving characterization equipment and sensors**

The implementation of nanomaterials in sensors has significantly increased the accuracy and sensitivity of these devices to the extent that a small amount of the desired material can be detected in a short notice. In addition, some of characterization methods have been

improved in sensitivity and efficiency by using nanostructures.