

# Nanotechnology applications essay example

[Technology](#), [Development](#)



## **NANOTECHNOLOGY APPLICATIONS**

Nanotechnology is a term used to describe research and technology at very small scales, such as atomic, molecular or macromolecular levels. The lengths of the technologies generally involved are in the 1 - 100 nanometer range (National Science Foundation, 2000). The goal of nanotechnology is to take advantage of the unique characteristics of materials available when working at such small scale. Nanotechnology has found applications in almost all areas of science, such as medicine, electronics, energy, and agriculture, with new possibilities being developed at a rapid pace.

Some applications of nanotechnology are for very mundane and basic needs. Such an example is a filter that clears both micro-organisms and chemicals from drinking water (Gravotta, 2013). This filter system uses nanotechnology in two ways. First, silver nanoparticles are trapped within a cage of aluminum and chitosan, a carbohydrate that is extracted from animal shells, such as shrimp (Toan, 2009). The silver acts as an antimicrobial, while the cage helps prevent deposits from forming on the silver that would inhibit its function. Second, nanoparticles that can remove lead or arsenic are also included. The highlight of this filter is its low cost and very green production profile, making it ideal for production and use in less developed countries (Gravotta, 2013).

An additional very basic need is the need for energy, particularly from renewable sources such as the sun. Nanotechnology has been used to produce solar cells that improve on the ability of the cell to convert sunshine into energy (Nanowerk News, 2013). By making the basic components of the cell extremely thin, on the order of two layers, each one molecule thick, the

power conversion of the material is maximized. Researchers in this area say that such cells would be second only to reactor-grade uranium in the weight to energy produced ratio. Two materials being considered for this type of cell molybdenum disulfide and molybdenum diselenide (Nanowerk News, 2013). Cells of this type have many advantages beyond efficiency including low component cost, ease of shipping and installation, durability, and extreme light weight which is good for space exploration applications. However, large scale manufacturing of the molybdenum compounds is still in development and is needed to reach this technology's full potential (Nanowerk News, 2013).

The medical field is another area that has been very actively exploring the uses of nanotechnology. An example of an application in medicine is a very recently announced novel vaccination method that uses gold nanorods to mimic a virus and carry on its surface specific proteins that trigger reaction by the immune system (Science Daily, 2013). The particular vaccine reported was against respiratory syncytial virus (RSV) which is a leading cause of lower respiratory tract infections. The study showed that not only did the nanorod mimic trigger the immune reaction, the vaccine was not toxic. The doctors involved stated that the platform could be used to mount immune responses for any virus and also bacteria or fungus (Science Daily, 2013).

Nanotechnology has proven to be highly applicable to many areas of scientific development. The three applications discussed here, involving water filtration, energy production, and healthcare are among just some of the more recent developments in this very rapidly moving field. As the

technology matures, even more applications will be seen, from high technology applications to uses in daily life.

## References

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