ROLE OF NANOTECHNOLOGY IN SMART PHONE

A.L.Subramaniyan, Assistant professor in physics, Thiagarajar College of Engineering, Madurai
alsphy@tce.edu

https://doi.org/10.59094/emsj.v56i5-6.70

Abstract: Smart phone has changed at a rapid speed since its launch. We all have experienced the change from key pad to touch screen, connecting smart phone to internet and attending online class or doing net banking transactions. Smart phone are being used for shopping online, placing orders from restaurants and also book cinema tickets or get the medicine in emergency. The velocity of change with smart phone still continues and we will experience many changes in future. The reason behind these additional features can be due to nanotechnology. Some changes can be making the smart phone water proof and dust proof .We can swim with smart phones in pocket and rains may not damage the smart phone. In addition to this smart phone may become bendable. All this changes can be due to nanotechnology. In this article we discuss how nanotechnology can contribute to smart phones.

Introduction:
Technology is derived from a Greek word , tekhnē which means it deals with the knowledge of making things. In general it can refer to adaptations made in our environment or society for more comfort or better living conditions. The invention of wheel is of prime importance as it paved the way for farther travel and also introduced rotatory parts in machinery. There are many types of technology which include Biotechnology, Manufacturing technology, Production technology, Block chain technology, Quantum technology , Agriculture technology, Automobile technology Aerospace Technology & Nanotechnology etc. Every technology has its own applications and limitations. Nanotechnology is a technology involving synthesis, design and application of materials at nanoscale such that at least one or more dimensions are less than a nanometer. It is a technology of dwarf materials. The word nano refers to one billionth of a meter and is a Greek word which implies dwarf in English. The first idea of nanotechnology was given by Sir Richard Feynman in 1959 who is the Father of nanotechnology. In the annual American physical society meeting at Caltech in 1959 Richard Feynman gave a lecture on, There is plenty of room at bottom and indicated that we would enter a new field of physics. Though nanotechnology based products, Lycurgus cup was used by Romans as old as 4TH century AD, the invention of Scanning Tunneling Microscope by Binnig and Rohrer in 1981 paved the way for modern nanotechnology. The term nanotechnology was first coined by the Japanese scientist and Professor Nario Taguchi in 1974. Several discoveries like Carbon nanotube, Graphene and other two dimensional materials have revolutionized the electronic and communication industry since 1990.
Applications of Nanotechnology:

The fascinating things about nanotechnology is it is a highly interdisciplinary technology and built with basics of Electrical, Electronic, Chemical, and Bio technologies. It also combines the effects of manufacturing technology, production technology and energy engineering basics. Since it is built on basics of various disciplines and technologies it has wide range of applications from formulating a highly efficient sun screen lotion (Absorbing Ultra Violet Rays) to the treatment of cancer. It has shown its impact in all sectors including construction, healthcare automotive, aerospace and automobile to genetic engineering. Strong cement, better activated drugs, efficient heat transfer radiation shield, Nano enabled smart sensors and self cleaning glasses are some outcome of nanotechnology.

Nanodiodes, Nanotransistor, Nanoelectrodes & Nanocapacitors can pave the way for Nano Electro Mechanical Systems (NEMS) and replace Micro Electro Mechanical Systems (MEMS). Quantum computers could be realized through nonmaterial’s like quantum dots, Probably, we can think of our dress which can change colour according to external environment, respond to our body size and elongate. We can have water repellant shoes and fire retardant textiles. A major contribution of nanotechnology is in the field of electronics and communication.

Nanotechnology is used widely in electronic applications, It provides faster, smaller and more portable systems, These systems can manage and store larger and larger amounts of information. Applications also include Flash memory chips for iPod Nanos, antimicrobial and antibacterial coatings on the mouse, the keyboard, and the cell phone castings. Nanoelectronics uses the nanostructured polymer films as organic light-emitting diodes or OLEDs, which offer longer lifetimes. A solution for many problems existing with the present smart phone, can be provided by nanotechnology as shown in Fig.1

![Fig.1 Nanotechnology solutions for problems with smart phones.](image-url)
**NANO COATINGS FOR WATER PROOF SMART PHONES:**

Nanocoating is a process by which a thin layer of thickness about less than 100 nm is deposited on the substrate by several techniques for improving some property of the base material like wear resistance, abrasion resistance, hardness and making it water repellant. Nano coatings can be made by several techniques like sol-gel, dip coating, Chemical Vapour Deposition and Spin coating. The nano-coating on the base surface can create hydrophobic (water repellant) and oleophobic (oil repellent). Even superhydrophobic coatings can be made. Some plant leaves, such as the lotus leaf and insect wings are hydrophobic. Thus we can imaging water rolling off our mobile phones without getting into it. Water proof mobile phones are available in the market.

**FLEXIBLE ELECTRONICS THROUGH NANOTECHNOLOGY**

Nanomaterials are playing a vital role in the development of flexible electronics. Flexible electronics is possible through manipulation of matter at nanoscale. CNT polymer composites based electronics, CNT based flexible supercapacitors are nanomaterials of importance in electronic industry. Graphene is proving to be a dominant material in flexible electronics. Other materials cannot match the combination of its high electrical conductivity, flexibility, and good physical strength. Flexible electronic devices have already made their way into the commercial realm, and the coming years are bound to see huge velocity of technological changes.

**Efficient and new ways of recharging smart phone**

Usually when we use the battery the charge gets reduced. But by combining the piezoelectric affects coupled with nanostructure materials, new ways of recharging mobiles are presented by Zhong Lin Wang’s and his team. With this nano generators we could just charge our phones by walking. Fast recharging time through nonmaterial’s can be provided by use of supercapacitors made with nanostructures.

**Conclusion**

Nanotechnology can provide water repellant smart phones and make them smarter. We may have smart phones without battery chargers and charging could be by our movement of hands or morning walk. Bendable and foldable OLED displays have created more comfort in the use of smart phones. Better clarity and life time of touch screens would be improved by polymer nanocomposites. Nanotechnology can provide thin batteries with high energy density which can reduce the weight of smart phone, reduce power consumption and also provide long recharge time with more life cycles.

**References**