

Significance Of Chemistry In Technological Development And Brief Study Of Chemical Composition Of Electric Bulb And Smartphone

Mr.Satish Yeshwantrao Mane

Department of chemistry Shivneri Mahavidyalaya shirur Anantpal,Dist-Latur,Maharashtra,India,Pin-413544.

email-sssymane@gmail.com

Abstract: This article briefly discussed the role of basic science, especially chemistry, in the sustainable development of technology, and also discussed the chemical composition of electrical and electronic devices. The threat posed to natural resources, i.e. natural elements, is also discussed in this article in Very Brief.

Keywords: Science, Chemistry, Revolution, Technology, Electronic, Electrical

Introduction:

Chemistry is a science concerned with the study of the chemical composition, properties and orientation of matter. Chemistry plays an important role in science and technology as all materials, including products chemical products, have characteristic chemical properties, and the chemical properties of materials vary according to their chemical composition. In the process of technological development, chemistry plays an extremely important role. During the global industrial revolution, chemical production and iron production played a key role. In the 21st century, light bulbs are an indispensable part of our daily life. If we had no light bulbs, our life would become dark at night. Travel, hospital operations, administrative work, security, defense, etc. can easily be made in light of a light bulb. In this way, they are included in our essential goods. The mobile phone is a very useful and important device. It helps us in many different ways. It entertains and informs us. All we need to do is use this device intelligently and wisely. We must remember that this is primarily a device for communication purposes, but that does not mean that we continue to waste hours chatting or sending messages. We must also remember that spending too much time on mobile phones is very dangerous because cell phones emit harmful radiation which leads to various diseases.



Source: <https://lumenauthority.com/light-bulb-evolution/>

Chemistry of Bulb:

¹The tube consists of a vacuum medium enclosed in glass inside the glass. The current flowing through the tungsten filament has a high melting point of about 3680 °C, and the tungsten filament can withstand high temperatures of 4500 degrees or more. The development of tungsten filament is considered the greatest advancement in light bulb technology because these filaments can be manufactured cheaply and last longer than any previous material. Lead wire or lead wire is usually made of iron-nickel wire. This part of the wire is dipped in the solder solution to help the wire stick to the glass better. ⁴The bulb itself is made of glass and contains a mixture of gases, usually argon and nitrogen, which increases the life of the filament. Air is pumped out of the bulb and replaced by gases. A standardized facility that keeps everything in place. The base, known as the "Edison screw base", was originally made of brass and insulated with plaster of Paris and later porcelain. Today, aluminum is used for the exterior and glass is used to insulate the inside from the base, creating a stronger base.

Importance of Telephone/Mobile phones:

The mobile phone is one of the best electronic communication devices and today it is also an integral part of our daily routine as it is the best means of exchanging information in written form. copy, audio and video very quickly and accurately. This development takes a long time to reach the current stage. A number of scientists are contributing to the current technological development.

The technological revolution in telephone to mobile phone:

⁴In 1672, Robert Hooke, a scientist, first created an audio phone consisting of two soup and scientists Hooke observed that sound could move a yarn or wandered a sucking tube One party for other

listner in 1796, telegraph equipment was built, including 44 wires are allowed to transmit 22 characters. The machines select to create the transmitted signals at a distance of 30 miles. Very cruel configuration I.E the signals were received by the servant to Aranjuez, Spain, holding live rope. Poor people jump into each shock activated by a person in Madrid. It is very cruel but it works. It has been rebuilt. The device has been rebuilt to displaysparkslike Thr signals,insteadofpeoplewithelectric shocks.In 1834, Italian scientist and inventor Antonio Meucci built a sound phone as a way to communicate in the middle of the Florence Theater's scene and control room in Florence. What phones on Shios and always work? Scientist Samuel B.Mors invented that you could transfer messages by pressing down or releasing a button in the interval to transmit a sound model. This is called Morse.in 1849 Italian scientist nodded in Aosta Innocenzo Manzetti invented the idea of the Automaton. German scientist, Johann Philipp Reis, developed his phone since 1857. The transmitter is difficult to use. The needle and exposure are necessary for the device's operation. It is called a "phone" because it transmits the sound of electric sound, but not the phones on the market.Cyrus West Field, in 1867, placed the first cross-Atlantic phone cable, connecting England and the United States by Telegraph. This project was filled with failures before it was completed in August 1858.



Source:History of telephone uplodaded by johnathan Davison,oct 2,2017

Chemistry of Mobile phones

²Nearly 70 elements of the periodic table are found in smartphones. Small amounts of yttrium, europium, and dysprosium help produce color on the phone's liquid crystal display (LCD). Gadolinium, lanthanum and terbium make screens shiny. The screen of the mobile phone contains some rare earth elements. The distribution of these elements in the smartphone is as follows.

Chemical composition of touch screen of smartphone:

²Smartphone touchscreens are made primarily of aluminosilicate glass, a mixture of aluminum oxide and silicon dioxide, and then placed in a hot tub of molten salt. The purpose is to allow smaller sodium ions to leave the glass and larger potassium ions to take their place. ³These take up more space and are pressed together as the glass cools, creating a layer of compressive stress on the glass and enhancing the glass's strength and resistance to mechanical damage. It is a thin, transparent and conductive layer of indium tin oxide deposited on glass to allow it to act as a touch screen. Some rare earth elements are also present in very small amounts and help to produce the colors displayed on the screen.

Chemical Composition of Battries in smartphone:

²Most phones today use lithium-ion batteries. These batteries tend to use lithium-cobalt oxide as the positive electrode in the battery (although other transition metals are sometimes used instead of cobalt), while the negative electrode is formed from carbon as carbon. Lead. ⁵It will also have an organic solvent to act as an electrolyte liquid. The lithium in the positive electrode ionizes as the battery is charged and moves through the layers of the graphite electrode. During discharge, the ions return to the positive electrode. The battery itself is usually housed in an aluminum case.

Chemical Composition of electronic in smartphone:

²A wide range of elements and compounds are used in the electronics of phones. The chip, the phone's processor, is made of pure silicon, which is then exposed to oxygen and heat to create a layer of silicon dioxide on its surface. Then parts of this silicon dioxide layer are removed where the current needs to flow. Silicon does not conduct electricity if it is not "doped" with other elements. This process involves bombarding silicon with various elements, which may include phosphorus, antimony, arsenic, boron, indium or gallium. ⁵Different types of P- and N-type semiconductors are produced depending on the element used, with boron being the most common P-type dopant. The microelectronic components and wiring of the phone are mainly made of copper, gold and silver. Tantalum is also used, which is the main

component of microcapacitors. A variety of other elements, including platinum and palladium, are also used, but the details of their specific applications are a bit harder to find! Solder is used to join electrical components-in the past it was usually made of tin and lead, but in recent years lead-free alternatives have been sought, many of which use a combination of mixture of tin, silver and copper. Both the phone's microphone and speaker contain magnets, usually a neodymium-iron-boron alloy, although dysprosium and praseodymium are also commonly found in this alloy. They are also found in the vibrator of the phone.

The Casing

²The elements present in the phone case will depend on whether the case is metal or plastic, or a mixture of the two. The metal case can be made of magnesium alloy, while the plastic case will, of course, be made from carbon. Enclosures will often also contain flame retardant compounds-brominated flame retardants are still commonly used, but efforts are being made to minimize their use, and so other organic compounds are not. ³Bromine is now used more often. As noted above, the silicon dioxide layer on a semiconductor device prevents current from flowing into unwanted areas of the semiconductor, specifically between transistors (essentially a form of switch) and silicon. Transistors are getting smaller and smaller, and in doing so, the insulation between them and the silicon also becomes thinner. However, this is limited by the size of silicon atoms and, in fact, only about 5 atoms. This also requires the use of a different material for transistors, with titanium nitride and titanium aluminum nitride used. To connect transistors with copper layers connected to semiconductors, tungsten is used as a contact. Tungsten also found using external semiconductor devices, as the weight of the vibration engine in the phone.

Threats of smarhtone to the chemistry

³Research by writer Josh Gabbatis published on independent news.co.uk shows that billions of mobile phones are thrown away or replaced every month around the world and, for this reason, their use is overwhelming. Elements in smartphone manufacturing that pose a threat to some important and rare phone elements include copper, gold, silver, lithium, cobalt, rare earth elements, yttrium, terbium, and dysprosium. We use them so quickly that they will dissipate around the world in less than 100 years. "

Conclusion:

It is concluding that from above discussion the basic science and their principles are play vital role in the development of technology. Basic research in the field of science can improve technological development. Sustainability in research is the need of development. Therefore it is necessary that the use of natural resources is to be carefully for sustainable development.

References:

1. Chemistry of light bulb still a bright idea, Brian Rohrig, April -2003, Chem matter, 11-13.
2. Materials chemistry, The chemical elements of a smartphone, Compound interest, Feb 19, 2014, <https://www.compoundchem.com/2014/02/19/the-chemical-elements-of-a-smartphone/>
3. Endangered elements used to make mobile phones are running out quickly, Scientist warn, Josh Gabbatis science correspondent Tuesday 22 January 2019, <https://www.independent.co.uk/news/science/mobile-phones-elements-periodic-table-endangered-chemicals-st-andrews-a8739921.html>
4. The light bulb evolution, history of light bulbs throughout years, Stephen, April 1, 2021, Lumen authority, <https://lumenauthority.com/light-bulb-evolution/>.
5. Smartphones: Smart chemistry, Brian Rohrig, April/may 2015, chem. Matter, ACS, p 10-12.