



An overview on recent innovation in chemistry that can change the world

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Abstract:

In present article we are trying to only highlight and review some landmark research which was done in chemistry that can revolutionized the science and technology in recent period. This research had greater influence on the human development.

Keywords: Overview, Innovation, Noble Prize, chemistry, technology, sustainability.

Introduction:

The science and technology plays an important role in the development of industrial, economic growth of the every nations. On the planet earth the natural resources are very limited as per need of growing human population rate, due to over exploitation all the natural resources reaches to its extinction stage. Innovation is needed to save these resources and improved technology can support for efficient use of natural resources and can save resources. Scientific research and development is concerning with sustainable development. Chemistry is inseparable part of human life everything in the world is made up of basic building blocks known as elements. ¹⁰“Chemistry may be involved not only in the initial stages of research but also in intermediate stages and in the evaluation of impact and hence contributing in key ways at every stage of the technological innovation chain”. ¹⁰Chemistry has given the world wide array of new materials, in the all field of technology.

¹“On the occasion of 100th foundation anniversary of IUPAC and 150th anniversary of Dimitri Mendeleev’s first publication on the periodic table of an elements. ²The initiative has started by IUPAC since year 2019, to identify and recognize the value of chemistry and chemist and inform to the general public as to how the chemical sciences contribute to the well being of society and the sustainability of planet earth”.

²Recent Top ten technologies in chemistry, 2019

- i) Nanoparticle
- ii) Enantioselective Organocatalysis
- iii) Flow chemistry
- iv) Reactive Extrusion
- v) Metal organic framework
- vi) Directed evolution of selective enzymes
- vii) Turning plastic to Monomer
- viii) Reversible deactivation of radical polymerization
- ix) 3D-bioprinting
- x) Solid state batteries

¹Top ten technologies in chemistry, 2020

i) Aggregation-induced emission ii) Artificial intelligence iii) Dual-ion batteries iv) High-pressure inorganic chemistry v) Liquid gating technology vi) Macromonomer for better plastic recycling vii) Microbiome and bioactive compounds viii) Nanosensor ix) Rapid diagnostic for testing x) RNA Vaccines

²Top ten technologies in chemistry, 2021

i) Artificial humic matter from biomass ii) Blockchain technology iii) Chemiluminescence for biological use iv) Chemical synthesis of RNA and DNA v) Semi-synthetic life vi) Single cell metabolomic vii) Sonichemical coating viii) Superwettability ix) Sustainable production of ammonia x) Targeted protein degradation.

The Noble Prize winners in last decade of years.

³“The nobel prize in chemistry 2021 was awarded jointly to Benjamin list and David W.C Mac Millan for the development of asymmetric organocatalysis this catalyst is an ingenious tool for building molecule .This research can greatly impact on pharmaceutical field and made chemistry greener.Organic catalyst have stable framework of carbon atoms,to which more active chemical group can attach .These often contain common elements such as oxygen,nitrogen,sulphur or phosphorous.This means that these catalyst are both environmentally friendly and cheap to produce,it can be used to drive multitudes of chemical reactions,using this reactions researchers can construct more efficiently anything from new pharmaceuticals to molecule that can capture light in solar cells.



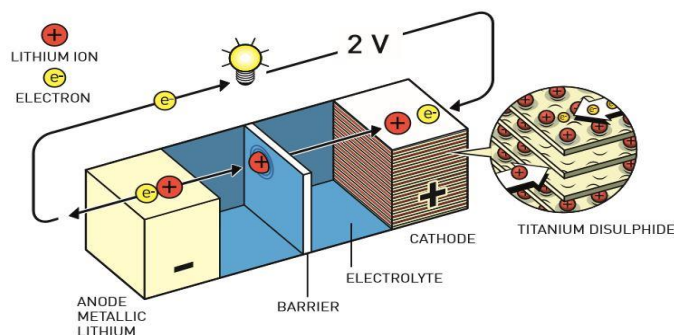
Source: ⁴The Nobel Prize in chemistry 2021-popular information-Noble prize.org

“The Royal Swedish academy of science declared the Nobel Prize of 2020 in chemistry to the scientist Emmanuelle Charpentier of france and Jennifer A Doudna of the U.S for the development of CRISPAR-Cas9 DNA snipping “scissors” a method for genome editing, (rewriting the code of life).This technique can used to change the DNA of animals,plants and microorganism with extremely high precision.This technology can revolutionary impact on the life sciences,and contributing to new cancer therapies and may make the dream of curing inherited diseases”.



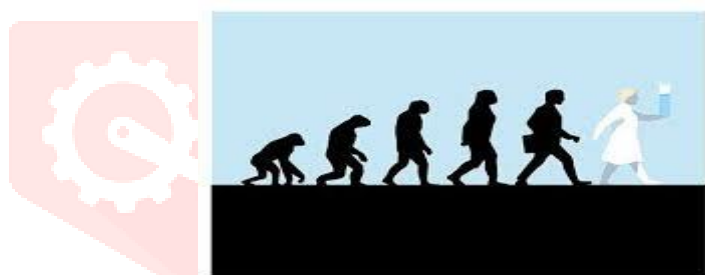
Source: Press release: The Noble prize in chemistry 2020 Nobelprize.org

⁶“The noble prize in chemistry 2019 was awarded John B.Goodenough,The university of Texas at Austin,USA,M.Stanely Whittingham Binghamton University,State University of New York,USA and Akira Yoshino of Asahi Kasei Corporation,Tokyo,Japan Meijo University,Nagoya,Japan “for the development of lithium-ion batteries” ⁶“Lithium ion batteries are used globally to power the portable electronics that we use to communicate,work ,study,listen to music and search for knowledge.Lithium ion batteries have also enable the development of long-range electric cars and the storage of energy from renewable sources,such as soar and wind power”.



Source: The Nobel Prize in chemistry 2019 popular information Noble prize .org

⁷“The noble prize in chemistry 2018 was divided,one half awarded to Frances H.Arnold “for the directed evolution of enzymes”,the other half jointly to George P.Smith and sir Gregory P.Winter”for the phage display of peptides and antibodies.”for the way they have taken control of evolution and used it for the greatest benefit to humankind.Enzymes developed through direct evolution are now used to produce biofuels and pharmaceuticals,among other things.Antibodies evolved using a method called phage display can combat autoimmune diseases and,in some cases,cure metastatic cancer”.



Source:The Noble Prize in chemistry 2018-Popular information-Noble prize.org

⁸“The Noble prize in chemistry 2017 was awarded to Jacques Dubochet,Joachim frank and Richard Henderson for the development of cryo-electron microscopy,which both simplifies and improves the imaging of iomolecules.This method has moved biochemistry into a new era.”

⁹“The Noble Prize in chemistry 2016 was awarded to Jean-Pierre Sauvage,Sir J.Fraser Stoddart and Bernard L.Feringa for their design and production of molecular machines.They have developed molecules with controllable movements,Which can perform a task when energy is added”.

¹¹“Thomas Lindahal,Paul Modrich and Aziz Sancar was awarded the noble prize in 2015 for having mapped ,at molecular level,how cell repair damage DNA and safeguard the genetic information.Their work has provided fundamental knowledge of how a living cell functions and is,for instance,used for the development of new cancer treatements”.

¹²“The Noble Prize in chemistry 2014 was awarded jointly to Eric Betzig,Stefan W Hell and william E.Moerner “for development of super-resolved fluorescence microscopy.This research overcome the limitation of optical microscopy”.

¹³“The Noble Prize in chemistry 2013 was awarded jointly to Martin Carplus, Michael Levitt and Arieh Warshel” for the development of multiscale models for complex chemical systems.” This research laid the foundation for the powerful programs that are used to understand and predict chemical processes. Computer models mirroring real life have become crucial for most advances made in chemistry today.”

¹⁴“The Nobel Prize in chemistry 2012 was awarded jointly to Robert J. Lefkowitz and Brian K. Kobilka for ground breaking discovery that reveal the inner working of an important family of G-protein-coupled receptors.

Conclusion:

All the above described research in chemistry has greater importance in the development and it can help to human to solve number of existing problems in all the fields of science, technology and innovations. Hence from above observation of research in chemistry it is concluded that the research in Chemistry has greater influence on the human life that can change the world. Research in chemistry can help in the achievement of the Millennium development goals and sustainable development goals worldwide. Science and technology is inseparable part of human life.

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