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# Environmental Chemistry and Eco-Friendly Development

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## Abstract

Environmental Chemistry is one of the most explored subject these days. Major research Environmental Chemistry aims to reduce or eradicate the production of harmful bi-products and maximizing the desired product in an eco friendly way. The Environmental Chemistry is required to minimize the harm of the nature by anthropogenic materials and the processes applied to generate them. Environmental Chemistry indicates research emerges from scientific discoveries about effluence responsiveness. Environmental Chemistry involves ideas which minimize or eliminates the use or production of unsafe substances. Scientists and Chemists can significantly minimize the risk to environment and health of human by the help of all the valuable ideology of Environmental Chemistry. The ideas of Environmental Chemistry can be achieved by the use environmental friendly, harmless, reproducible and solvents and catalysts during production of medicine, and in researches. Environmental Chemistry could include anything from reducing waste to even disposing of waste in the correct manner. All chemical wastes should be disposed of in the best possible manner without causing any damage to the environment and living beings.

**Keywords: Environmental Chemistry, Consequences, Hazardous etc.**

## Introduction-

Ecological issues in the past were considered as part of the economic system and the rapid exploitation of natural resources. It took many years to consider the established ways that materials were used (feedstocks), the initial design of chemical processes, the hazardous properties of products, the energy consumption and other parameters involved in the manufacture of products (life cycle, recycling, etc). Environmental Chemistry was for many years a relatively abstract idea with no basic principles and definitions of practical applications. Now, the term Environmental Chemistry has been defined as “the invention, design and application of chemical products and processes to reduce or to eliminate the use and generation of hazardous substances for workers and consumers”. The definition of Environmental Chemistry starts with the concept of invention and design. Another aspect of the definition of Environmental Chemistry is in the phrase “use and generation of hazardous substances”. Environmental Chemistry aims not only for safer products, less hazardous consequences to the environment, saving energy and water, but includes broader issues which can promote in the end Sustainable Development. In recent years Environmental Chemistry has gained a strong foothold in the areas of research and development in both industry and academia, especially in the developed industrial countries. The U.S

environmental law “The Pollution Prevention ACT of 1990” stated that the first choice for preventing pollution is to design industrial processes that do not lead to waste production .”

## Basic Ideas of Environmental Chemistry-

Atom Economy; Synthetic methods should be designed to maximize the incorporation of all materials used in the process into the final product health and environment , solvents and auxiliaries*;* chose the safest solvents available for any given step and avoid whenever possible,design for energy efficiency*;* choose the least energy demanding chemical route. Ambient temperature and pressure are optimal and real time pollution prevention*;* monitor chemical reaction in real time, in process and control prior to the formation of hazardous substance.-

1. **Dry Cleaning of Clothes-**

Percholoroethylene (perc) is the solvent most commonly used in dry cleaning clothes. A new technology known as miCell technology is developed by Joseph De Simons, Timothy Remark and James Mcclain in which liquid carbon dioxide can be used as a safer solvent along with a surfactant to dry clean clothes. This method is now being used commercially by some dry cleaners.

**2. Solution to Turn Turbid Water Clear-**

Tamarind seed kernel powder, discarded as agriculture waste, is a good agent to create municipal and industrial waste water clear. the current follow is to use Al-salt to treat such water. it's been found that alum will increase poisonous ions in treated water and will cause diseases like Alzheimer’s. On the opposite hand kernel powder is not- poisonous and is perishable and price effective. Flocculants with slurries were ready by combining measured quantity of clay and water. The result showed aggregation of the powder and suspended particles were a lot of porous and allowed water to exudates and become compact a lot of simply and shaped larger volume of clear water. Starch flocks on the opposite hand were found to be light-weight weight and fewer porous and thus didn’t enable water to taste it simply. The study establishes the powder’s potential as associate degree economic flocculants with performance shut more matured flocculants like K2SO4Al2(SO4)3.24H2O (potash alum).

## Prospective of Environmental Chemistry -

**a. Oxidation chemical agent and contact action-**

Since these substances were typically employed in very massive volumes Needed to convert numerous pounds of petrochemicals, there was a major inheritance of those Metals being discharged to the setting and having substantial negative impact on human health and setting.

**b. Rainwater Harvesting System-**

Rain collector systems are extremely simple mechanical systems that connect to a gutter system or other rooftop water collection network and store rain water in a barrel or cistern for later nonpotable use (like watering plants, flushing toilets, and irrigation). These systems are extremely inexpensive.

**c. Computer Chips**

Many chemicals, huge amounts of water, and energy are required to manufacture computer chips. The protein, keratin of the feathers was worn to make a fiber form that is light but tough enough to withstand mechanical and thermal stresses.

**d. Medicine-**

The pharmaceutical industry is working to develop medicines with less harmful side-effects, by methods which produce less deadly waste.Merck and Codexis developed a second-generation green synthesis of sitagliptin that is The traditional method to make this medication employed a large number of steps, used large quantity of harmfulreagents and formed a large amount of toxic waste in the process. A biocatalysis company, Codexis, optimized both the enzyme and the chemical process which reduces hazard and waste to a great extent, is lucrative, and meets the requirements of the consumers.

**e. Combinatorial inexperienced chemistry-**

The chemistry of having the ability to create massive numbers of chemical compounds chop-chop on a little scale exploitation reaction matrices. The instance is lead that incorporates a massive no of derivatives. This chemistry has enabled massive no of gear to be created and their properties assessed while not the magnitude of the consequences of waste disposal.

**f. Energy focus-**

The environmental impact of energy usage square measure profound however haven't been as visible and as direct as a number of the hazards that haven't been expose by materials employed in manufacture, use and disposal of chemicals. There's a requirement to style substances and materials that square measure effective, economical and cheap at the capture, storage and transportation.

## Fields of Environmental Chemistry with New Scientific Developments-

In the last decade Environmental Chemistry and Engineering have advanced for a great variety of research and technology fields providing cutting-edge research and practical applications for a wide spectrum of chemical products and technological innovations. The most important research and technological fields of GC (green chemistry) and GE(green engineering) include solutions. Among other things, reduction of global warming and use of CO2 as a raw material for chemical synthesis, microwave, electrochemical and ultrasound synthetic methods, solvent free reactions (or water as a solvent), phytoremediation, waste management and wastewater, eco-friendly dyes and pigments, innovative food products, catalysis and biocatalysis, biopolymer technology, renewable materials, renewable energy sources, etc. Although there are many fields of innovation for environmental Chemistry and Engineering products are

a. Directed evolution. New enzymes for organic synthesis
b. b. Environmental Chemistry and synthetic processes in the pharmaceutical industry
c. c.Hydrogen production via catalytic splitting of water
d. d.Green and renewable energy sources
e. e.Environmental Chemistry and agricultural technologies benign to environment
f. f.Environmental Chemistry. Multi component reactions
g. g.Green flow chemistry and continuous processes in chemical industry



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Except for the above, there are also numerous other technological; fields of Environmental Chemistry and Engineering that have been advanced in the last years. Already, some these innovative inventions have been applied and improved sustainability, reduced environmental pollution and released less hazardous chemical products.

'Directed Evolution', Environmental Chemistry and Biocatalysts. In the biochemical engineer Frances Arnold (CALTECH) received the Millennium Technology Prize (1 million Euros, awarded by Technology Academy Finland, Helsinki ) inrecognition of her discoveries and research on the field of _directed evolution', which mimics natural evolution to create new and better proteins (enzymes for biocatalysis) in the laboratory. This technology have solved many important synthetic industrial problems, often replacing less efficient synthetic methods and sometimes harmful technologies. Thanks to directed evolution, sustainable development and clean technology (biocatalysis) become available in many fields of chemical industry.

## Conclusion-

Environmental chemistry is a brand new branch of science. Environmental Chemistry is new philosophical approach that through application and extension of the principles of Environmental Chemistry can contribute to sustainable development. It is clear that the challenge for the future chemical industry is based on safer products and processes designed by utilizing new ideas in fundamental research.

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