



Editorial Note on Environmental chemistry

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Introduction

The earth has just the right kind of conditions of temperature range, air, water, soil for supporting life and is protected from harmful rays from the outer space by the ozone layer. With progressive increase in human population and human activities, the quality of air, water, soil and other natural sources get degraded and become unfit for use by organisms. Increasing population, urbanization and industrialization has led to the decreased availability of water. The quality of water used is also being deteriorated as it is getting more and more polluted. You may be aware of at least some health hazards and harmful effects of water pollution. The main components of soil are 90–95%. Inorganic matter and 5–10% organic matter besides soil contains water and air, the composition of the soil varies considerably place to place. Soil has become dumping ground of most of the waste products There will be a great loss of earth crust. The dumping of nuclear waste is a world side problem, cause of soil pollution. In this lesson a detailed account of various types, sources and effects of water pollutants is given. Some methods of water pollution control and legislatures involved have also been discussed. . It causes unwanted effects. In this lesson you shall learn about the sources of pollutants and their effects on environment. Thus the pollution in many ways threaten the existence of many organisms including

human being on the earth. Therefore, any threat of degradation or damage to the environment should be a matter of concern the green chemistry is environment friendly living on design of chemical products with their impacts on human health and on environment.

Applications of Environmental Chemistry

Some applications of environmental chemistry are mentioned below.

- Environmental Chemistry studies the risk factors of all the chemicals in-depth to get a solution for the safety purpose of the environment.
- It is applied in the study of new products and their effects on the environment.
- Environmental Chemistry is used in the method of protection of groundwater which is polluted by soil, dust, and the waste particles.
- It is useful for the protection of surface water from the contaminants through the process of sedimentation, bacteriological, and radiation.
- The quality of the soil is protected by the methods of environmental chemicals such as by the use of indicators like ecotoxicological and chemical.
- Impervious surfaces inside cities like the parking lots, rooftops & roads are prone to build up unwanted pollutants such as motor oil, gasoline, nutrients and sediment (soil), hydrocarbon compounds, metals.
- Environmental chemistry is applied in the Waste Management and Cleaner Production.

Metals and their essentiality for life

Chemically, metals are defined as “elements,

Which conduct electricity, have a metallic luster, are malleable and ductile, form cations, and have basic oxides”. Terms usually used in relation to metals in biological and environmental studies are metal, metalloid, semimetal, light metal, heavy metal, essential metal, beneficial metal, toxic metal, abundant metal, available metal, trace metal, and micronutrient. Metals have very diverse applications and play an important role in the industry-dominated human society. Some metals have critically important physiological and biochemical functions in biological systems, and either their deficiency or excess can lead to disturbance of metabolism and therefore to various diseases. Some metals and metalloids are essential for (biological) life. They play important physiological and biochemical roles in the body as they may be part of biomolecules such as enzymes, which catalyze biochemical reactions in the body.

Sources of Heavy Metals in the Environment

Sources of heavy metals in the environment can be both natural/geogenic/lithogenic and anthropogenic. The natural or geological sources of heavy metals in the environment include weathering of metal-bearing rocks and volcanic eruptions. The global trends of industrialization and urbanization on Earth have led to an increase in the anthropogenic share of heavy metals in the environment . The anthropogenic sources of heavy metals in the environment include mining and industrial and agricultural activities. These metals (heavy metals) are released during mining and extraction of different elements from their respective ores. Heavy metals released to the atmosphere during mining, smelting, and other industrial processes return to the land through dry and wet deposition. Discharge of wastewaters such as industrial effluents and domestic sewage add heavy metals to the

environment. Application of chemical fertilizers and combustion of fossil fuels also contribute to the anthropogenic input of heavy metals in the environment. Regarding contents of heavy metals in commercial chemical fertilizers, phosphate fertilizers are particularly important.

Contamination of Natural Waters, Sediments, and Soils by Heavy Metals

Toxic trace metals pose an important threat to both aquatic and terrestrial ecosystems [39]. After release from both natural and anthropogenic sources, heavy metals contaminate natural water bodies, sediments, and soils. Heavy metals released into the atmosphere in volcanic eruptions and in different industrial emissions also ultimately return to the land and cause contamination of waters and soils. Since heavy metals are persistent in the environment, they either accumulate in biota or leach down into ground waters. Contamination of biota and groundwater with potentially toxic heavy metals has important implications for human health. It is important to assess the degree of heavy metal pollution in riverine ecosystems by investigating the concentrations of these elements and their distribution . shows a conceptual schematic of contamination of an aquatic (riverine) ecosystem with heavy metals. Different physicochemical and climatic factors affect the overall dynamics and biogeochemical cycling of heavy metals in the environment