CURRENT AND FUTURE PERSPECTIVES OF ENVIRONMENTAL POLLUTION AND IT'S REMEDIATION

First Edition

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Mr. Vinod Kr. Singh (M.Sc, CSIR –UGC- NET, PhD Pursuing) has a career of about 13 years of teaching and research. He is head of the Department of chemistry, Shivpati PG. College Shorhratgarh Siddharthnagar, affiliated to Siddhartha University kapilvastu Siddharthnagar. Mr. Singh received his B.Sc degree (2002), M.Sc degree (2004) from Rohilkhand University Bareilly and CSIR-NET (2005). He is a member of approval selection committee and several scientific societies. He has published 10 research papers in pre-reviewed journals, and international and national journals. He presented 20 papers in national seminars, He attended many national seminars, and also attended one orientation programme, two refresher courses and six Short-Term-Courses conduct by UGC-HRD, centre. His research and teaching interest includes theory and application of spectroscopy of liquid crystal molecules by DFT, methodology.

CONTENT TABLE

CHAPTER:8
OZONE LAYER DEPLETION: ITS CAUSES AND CONSEQUENCES

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Abstract

Ozone layer which is a part of the lower stratosphere has been continuously depleting over years. The ozone layer is a part of the atmosphere that contains high concentration of ozone molecules which absorb the harmful ultraviolet rays from the sun and prevents it from reaching the earth surface. Ozone layer depletion is one of the most significant issues in the present-day world. It is getting worse day by day and has become a threat to global environment as well as human civilization. The main sources of ozone layer depletion are the man-made chlorine related substances such as chlorofluorocarbons (CFCs), bromine, halons, carbon tetrachloride, methyl bromide, hydrofluorocarbons etc. When the ozone layer is significantly thinner over a particular region due to the release of ODS (Ozone depleting substances), it is termed as "Ozone Hole". The main effect of ozone layer depletion is the increase in ultraviolet rays that reaches the earth surface and makes serious ill effects on human beings, genetic changes, growth on plants, marine ecosystem, damage to possessions etc. Growing concern for ozone layer depletion has led to the adaptation of various policies by various countries to bring down the release of ozone depleting substances at an industrial level as well as individual level. This paper tries to assess the causes and consequences of global ozone depletion and presents some protective measures for preventing further depletion of ozone layer.

Keywords: Environment, Ill effects, Ozone depleting substances, Ozone hole, Policies

Introduction

Ozone layer is basically found in the second region of the atmosphere i.e. stratosphere. Ozone is created when the ultraviolet radiation from the sun strikes the molecules of oxygen (O_2) and split the oxygen atoms into two parts [2]. If a single atom of oxygen bumps into another O_2 it forms ozone (O_3). This process is known as Photolysis. The ozone shield consists of relatively high concentration of ozone, mainly concentrated in the stratosphere, between 15 to 35 km above the earth surface, with a peak concentration of ozone at 25 km from the ground

surface [3]. However, the concentration of ozone in the atmosphere is not constant. It varies with seasons, sun cycle, wind, and also geographical location of a place. Ozone is colorless and has very harsh odour in nature [4]. Ozone is measured in units called "Dobson Unit" [1]. Normal ozone concentration in any region is between 300-350 D.U[5]. But, ozone layer is depleting day by day due to the emission of ozone depleting substances produced by various man-made activities. Due to this, the harmful ultraviolet radiation from the sun reaches the earth surface and affects human health, plant growth, ecosystem etc.

Ozone layer depletion.

Ozone layer depletion is the gradual thing of the earth's ozone layer in the stratosphere. This occurs when the chlorine and bromine atoms in the atmosphere react with ozone and destroy the ozone molecules more rapidly. One chlorine atom may destroy 1,00,000 molecules of ozone. The destruction rate is much faster than its formation. The main cause of ozone depletion is the release of chemical compounds such as ozone depleting substances containing gaseous bromine or chlorine from industries or other human activities. Ozone concentration is higher between 19-23 km in the atmosphere [6]. Damage to the ozone layer was first identified in 1974. Due to this, the earth would be in direct contact with the sun's harmful ultraviolet rays.

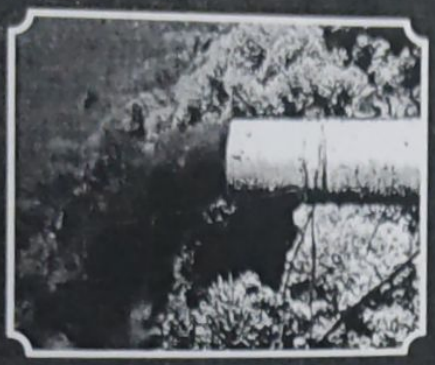
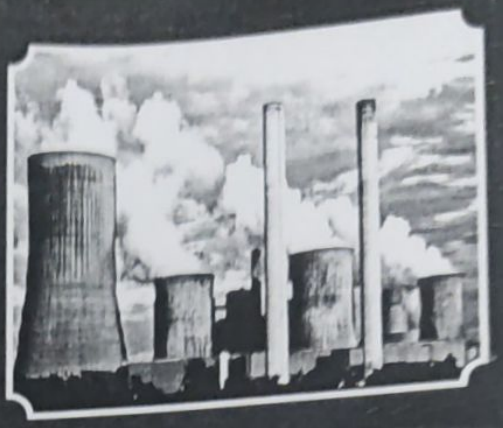
Ozone hole

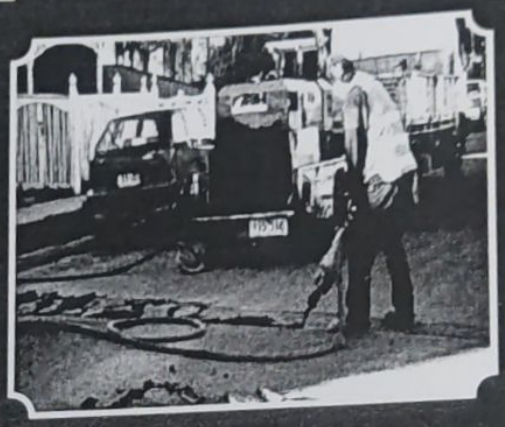
Ozone hole is referred to the region where the ozone layer has been depleted or thinned due to the release of various chemical compounds the term "Ozone hole" is used when the depletion level of ozone is below 200 Dobson unit. Ozone hole was first identified in Antarctica in the year 1970. Few years ago, ozone hole was also identified in the arctic region. Since 2000 the rate of ozone layer depletion is increasing at a rate of 0.5 percent per annum [7][8].. Due to this, ozone ultraviolet rays are penetrating in the lower atmosphere region and make serious ill effects to animal life.

Sources of ozone depleting substances

The depletion of ozone layer occurs when the ozone molecules react with ozone depleting substances. The major ozone depleting substances are chlorofluorocarbons (CFCs), bromine, halons, carbon tetrachloride, methyl bromide, hydrofluorocarbons, nitrous oxide, water vapour etc.

Chlorine molecules are rising from various sources. The most common source of chlorine is CFCs released from industrial as well as human activities [9]. Biomass burning and seal salt spray also adds a significant amount of chlorine to the atmosphere. Solid rocket boosters, compounds generated in sewage and other



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