

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

First Edition

Editors

Dr. Azad Kumar

Mr. Vinod Kumar Singh

Dr. Akhilesh Sharma



**THANUJ INTERNATIONAL PUBLISHERS,
TAMIL NADU, INDIA.**

First published in India in 2022

This edition published by Thanuj International publishers
©2022.Thanuj International Publishers. All rights reserved.

Apart from any use permitted under Indian copyright law, this publication may only be reproduced, stored or transmitted, in any form, or by any means with prior permission in writing of the publishers or in the case of reprographic production in accordance with the terms of licenses issued by the Copyright Licensing Agency.

Copy Right policy is to use papers that are natural, renewable and recyclable products and made from wood grown in sustainable forests. The logging and manufacturing processes are expected to conform to the environmental regulations of the country of origin. Whilst the advice and information in this book are believed to be true and accurate at the date of going to press, neither the authors nor the publisher can accept any legal responsibility or liability for any errors or omissions that may be made. In particular, (but without limiting the generality of the preceding disclaimer) every effort has been made to check quantity of chemicals; however it is still possible that errors have been missed.

ISBN: 978-93-94638-19-8

Price: Rs. 800. 00



Published by:

Thanuj International Publishers.
8/173-B, Vengayapalayam, Kakkaveri, Rasipuram,
Namakkal, Tamil Nadu,
India - 637406.
E-mail: thanujinternationalpublishers@gmail.com

Printed by:

Dhazh Computers (Graphic Designer)
No: 442- A, 10th East Cross Street,
Munthirithoppu, Annanagar,
Madurai - 20, Tamil Nadu, India.
E-mail: narennarayananasamy@gmail.com

About the Editors



Dr. Azad Kumar currently serves as an assistant professor in the Department of Chemistry, Siddharth University, Kapilvastu, Siddharthnagar. Azad Kumar received the B.Sc. Hons Degree in Chemistry from Dayalbagh Educational Institute, Dayalbagh Agra, in 2007, the M.Sc. degree in Chemistry from Dayalbagh Educational Institute, Dayalbagh Agra, in 2009. The M.Phil. degree in Chemistry from Dayalbagh Educational Institute, Dayalbagh Agra, in 2010, and qualified the CSIR-NET (2011). He has received his Ph.D. Degree in Chemistry from Babasaheb Bhimrao

Ambedkar University (A Central University), Lucknow, in 2018. Dr. Kumar is also a member of several scientific societies. His research and teaching interests include theory and application of nanomaterial, hybrid composite, and polymer. He has published 20 research papers in peer-reviewed journals and international conferences. He has served as an editorial member of some journals. He is teaching for the last 12 years in various institutes.



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 No.	Authors	Title of chapter	Page no.
1	¹ Amar Nath, ² Anamica and ³ P.P. Pande, Vinod Kumar Singh	COAGULANTS AND FLOCCULNTS FOR WASTEWATER TREATMENT	1-25
2	Tanushree Kain and Devendra Singh Rathore*	AIR POLLUTANTS EMISSION FROM THE BRICK KILN INDUSTRY, ITS IMPACT, AND REMEDIAL MEASURES	26-35
3	Manisha Khandelwal, Deeksha Sharma, Gangotri Pemawat, and Rama Kanwar Khangarot*	MECHANISTIC INSIGHTS INTO PHOTODEGRADATION OF ORGANIC DYES USING COPPER OXIDE NANOCATALYST	36-49
4	Prity Mehta and Sanjay Yadav*	DAIRY EFFLUENTS: SOURCES, CHARACTERISTICS AND ITS ENVIRONMENTAL IMPACT	50-57
5	Safana Asma'u Ibrahim ¹ & Tijjani Sabi'u Imam ²	POTENTIALS OF MICROALGAE IN BIOFUEL PRODUCTION	58-66
6	Kapil Kumar, Bhavya Singh, Rama Kanwar khangarot and Devendra Singh Rathore*	NANOTECHNOLOGY AND ITS APPLICATIONS AND IMPACT ON THE ENVIRONMENT	67-78
7	Shiv Mahendra Singh and Rashida Khatoon	OVERPOPULATION AND ITS IMPACT ON ENVIRONMENT	79-91
8	Pranoy Dey	OZONE LAYER DEPLETION: ITS CAUSES AND CONSEQUENCES	92-101
9	Ayushi Bhatnagar ¹ , Dr. Rama	PHOTODEGRADATION OF PHENOL USING PHYSIOCHEMICAL AND BIOLOGICAL METHODS	102-117

	Kanwar Khangarot ¹ , Kiran Meena ¹ , and Dr. Gangotri Pemawat ¹		
10	Lokesh Baloat	RECENT PROGRESS IN APPLICATION AND IMPLICATIONS OF ENVIRONMENTAL NANOTECHNOLOGY	118-124
11	Subhamoy Das ¹ , Surekha Chowdhury ² , Avishek Dolai ³	SUSTAINABLE AND ADAPTIVE APPROACHES TO SALINITY CHANGE IN WATER: A CASE STUDY FROM SOUTH BENGAL, INDIA	125-140
12	Vinod Kumar Singh	THE STUDY OF THE RADON, THORON LEVEL CONCENTRATION IN AND AROUND THE THERMAL POWER PLANT	141-144
13	Almas Khanam and Mohammad Akmal*	TOXIC HEAVY METAL REMOVAL FROM WATER USING SOME ADSORBENTS	145-173
14	Dr. Moon Mandal,* ‡ Dr. Mahmuda Khannam* ‡	SANITARY PRACTICES AND WASTE MANAGEMENT AMONG ADOLESCENT GIRLS & WOMEN IN RURAL AREA OF DALGAON CONSTITUENCY UNDER DARRANG DISTRICT, ASSAM: A CASE STUDY	174-185
15	Zaheen Hasan* and D.D.Tewari	EFFECT OF INDUSTRIALIZATION AND FERTILIZERS ON WATER QUALITY	186-195
16	Bhavya Singh ¹ , Kapil Kumar ¹ , Dr. Rama Kanwar Khangarot ² , and Dr. Devendra Singh Rathore ¹ *	COPPER-BASED NPS: SOURCES, FATE AND BIOAVAILABILITY IN AGROECOSYSTEM	196-210
17	Capt. Mukesh Kumar	ADSORPTION OF TOXIC METALS FROM WATER BY ADSORBENT	211-215
18	SK. Kamruzzaman	RECENT TRENDS IN SOLID WASTE MANAGEMENT AND ITS RECYCLING IN INDIA	216-222

CHAPTER:8

OZONE LAYER DEPLETION: ITS CAUSES AND CONSEQUENCES

Pranoy Dey

Department of Geography,
Birpara College, Alipurduar, West Bengal, Pin-735204

Email: pranoy.dey93@gmail.com

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 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" [5]. Normal ozone concentration in any region is between 300-350 D.U [6]. 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.

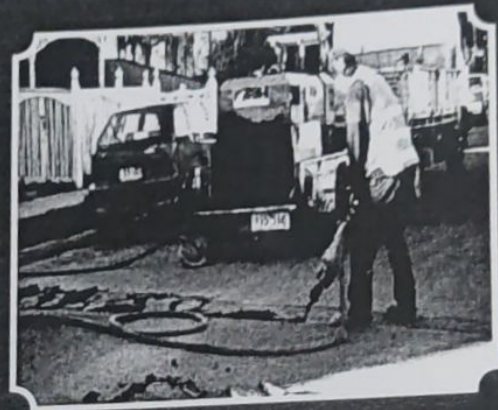
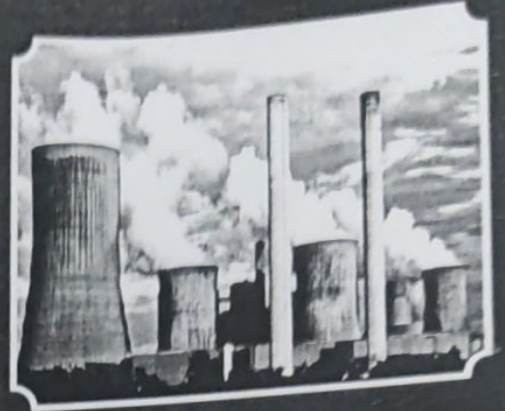
Ozone hole

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 sea salt spray also adds a significant amount of chlorine to the atmosphere. Solid rocket boosters, compounds generated in sewage and other



Publishers:

Thanuj International Publishers,
8/173-B, Vengayapalayam, Rasipuram,
Namakkal, Tamil Nadu, India – 637406.
E-mail: thanujinternationalpublishers@gmail.com

Printers:

Dhazh Computers
No: 442- A, 10th East Cross Street,
Munthirithoppu, Annanagar,
Madurai – 20, Tamil Nadu, India.
E-mail: narennarayanasamy@gmail.com

ISBN: 978-93-94638-19-8



9 789394 638198