BOOKS AND CHAPTERS IN A BOOK AUTHORDED BY FACULTIES

(LAST FIVE YEARS)

SR. NO.	NAME OF FACULTIES	NAME OF BOOK/CHAPTER	NATIONAL/ INTERNATIONAL	SESSION/YEAR	ISBN/ISSN No.	PUBLISHER
2020-21						
1.	S. C. Gedam	**Name of Book:** PHENOMENON IN ENVIRONMENTAL AND NANO SCIENCE **Name of Chapter:** Thermoluminescence Behavior and Evaluation of Trapping Parameters in KMgSO4F: X (X = Cu or Dy or Eu) Nanophosphor	National	2020-21	978-93-89996-32-6	JAYA PUBLISHING HOUSE H-1/60, Sector – 16, Rohini, Delhi-110089 (INDIA)
2.	S. C. Gedam	**Name of Book:** PHENOMENON IN ENVIRONMENTAL AND NANO SCIENCE **Name of Chapter:** Luminescence of Ce3+ in KMgCl3 Nanomaterial by Novel Synthesis Routes	National	2020-21	978-93-89996-32-6	JAYA PUBLISHING HOUSE H-1/60, Sector – 16, Rohini, Delhi-110089 (INDIA)
3.	A. R. Bijwe	Text book of chemistry for B. Sc.	National	2020-21	ISBN: 978-93-87278-86-8	Dnyanpath Publication Amravati (India)
4.	L. L. Sawarkar	**Name of Book:** Current updates in Life Sciences **Name of Chapter:** Algae: Source of Biofuel	National	2020-21	ISBN: 978-81-923621-82	Pandit Jawaharlal Nehru Study Center, Shri Shivaji College of Arts, Commerce and Science, Akola (MS) India A National Publication
5.	L. L. Sawarkar	**Name of Book:** NCMR21- Peer-Reviewed Book Chapter **Name of Chapter:** Biochemical Composition Of Some Cyanobacteria	National	2020-21	ISBN : 978-81-95551-4-9	Adhar Publication, Amravati
6.	U. B. Mahatme & A. H. Rangari	Advanced Aspects of Engineering Research	National	2020-21	ISBN-13 (05) 978-93-90888-02-3 (Print) 978-93-90888-10-8 (eBook)	B. P. International
7.	U. B. Mahatme	Recent Trends in Chemical and Material Sciences	National	2020-21	ISBN-13 (15) 978-93-91473-41-9 (Print) 978-93-91473-49-5 (eBook)	B. P. International
8.	U. B. Mahatme	Basics of Nanoscience, Nanomaterials and Nanotechnology	National	2020-21	ISBN 978-93-91595-12-8 (Print) 978-93-91473-03-7 (eBook)	B. P. International
2021-22						
9.	A.P. Ganorkar	Chemistry B. Sc. SEM IV	National	2021-22	978-93-91331-78	Dnyanpath Publication

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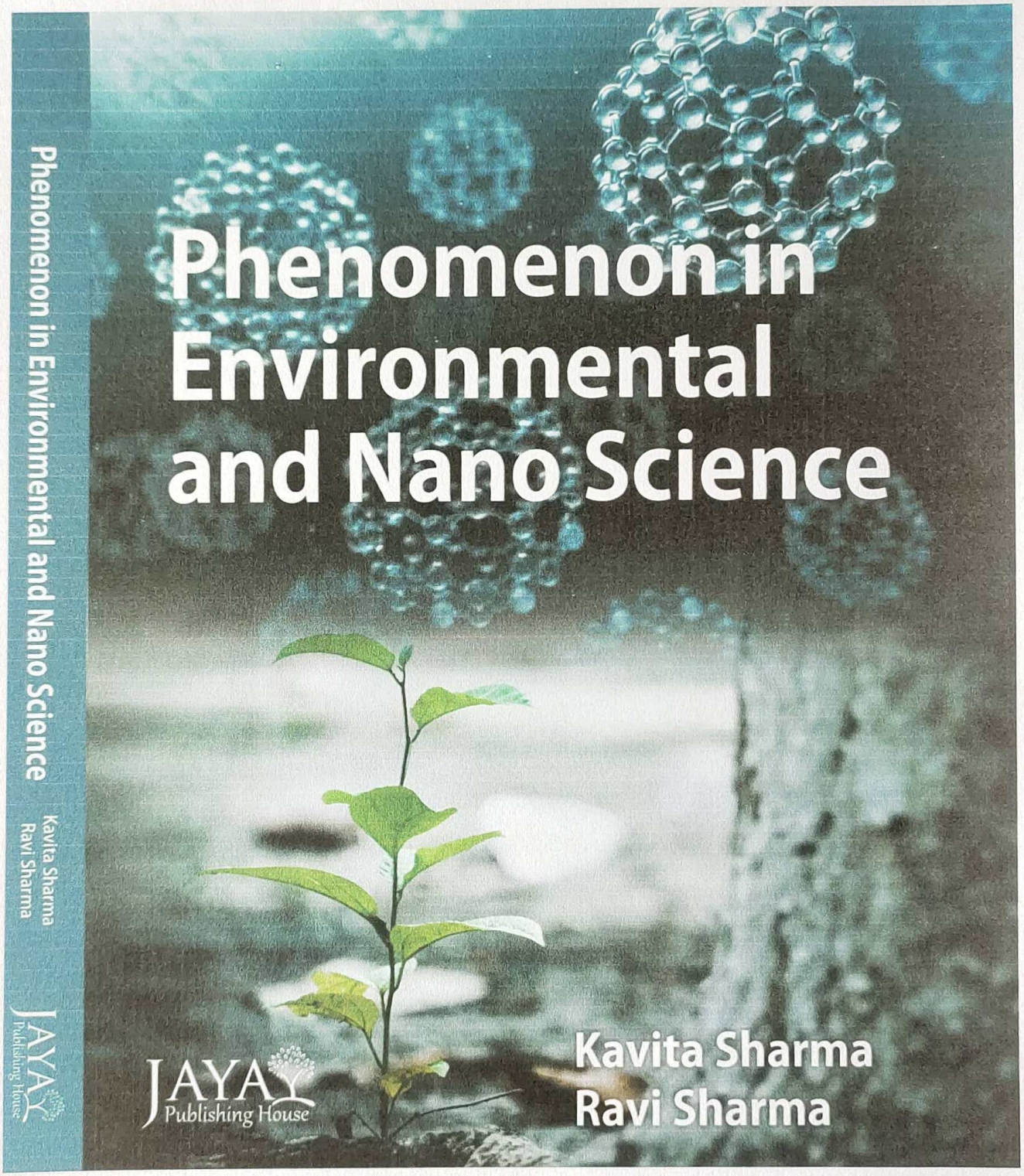

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Phenomenon in Environmental and Nano Science, Pages 67–79
Edited by: Kavita Sharma and Ravi Sharma

5

THERMOLUMINESCENCE BEHAVIOR AND EVALUATION OF TRAPPING PARAMETERS IN $KMgSO_4F$: X (X = Cu OR Dy or Eu) NANOPHOSPHOR

Kalpana Pande[1], S.R. Choube[1] and S.C. Gedam[2*]

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[2]*KZS Science College, Kalmeshwar, Nagpur-441501 (MH)*
[3]*Department of Physics, VMV Commerce, JMT Arts & JJP Science College, Nagpur-440008 (MH)*
**Email: gedam_sc@rediffmail.com*

Abstract

In the present study, new halonano-phosphor $KMgSO_4F$ is synthesized by wet chemical method. Study aims in calculation of trapping parameter such as geometrical factor (μ), Order of Kinetics (b), Trap depth (E) and frequency factor (s) associated with the isolated TL glow curve in order to get the information mechanism of trapping and recombination of charge carrier with the traps. Thermoluminescence glow curves of $KMgSO_4F$: Cu , $KMgSO_4F$: Dy and $KMgSO_4F$: Eu halo-sulphate phosphor have been investigated in detail at various concentrations, between the temperature region 50 to 300^{0}C. All TL glow curves showed single peak at 197.76^{0}C, 172.91^{0}C and 180.26^{0}C respectively. In this paper we present a brief review of the work on TL behavior of $KMgSO_4F$.

Keywords: Thermoluminescence, Phosphors, Wet chemical, Chen's method, Activation

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Key Features

- Importance of Remote Sensing and Medicinal researches to attain Environmental Sustainability.
- Experimental studies on microbial and antimicrobial activities of medicinal plants to enhance health and immunity.
- Novel approaches on synthesis of nanomaterials for increasing accuracy and effectiveness on material science applications.
- Advanced techniques for studying luminescence properties of nanoparticles.
- Extensive analysis of enzymes and projection of their immense industrial applications.

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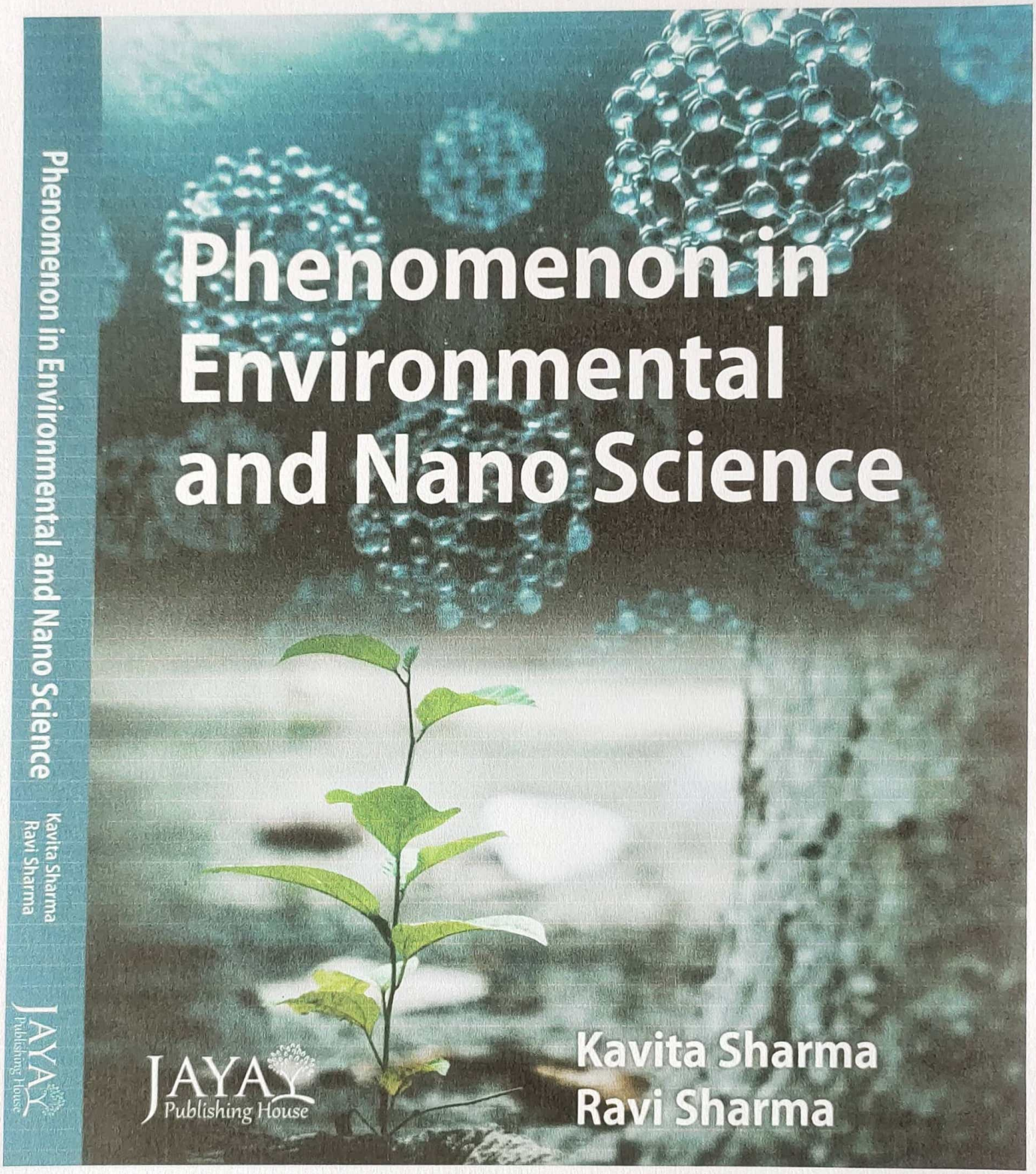

Phenomenon in Environmental and Nano Science, Pages 201–211
Edited by: Kavita Sharma and Ravi Sharma

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LUMINESCENCE OF Ce^{3+} IN $KMgCl_3$ NANOMATERIAL BY NOVEL SYNTHESIS ROUTES

S.C. Gedam

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Email: gedam_sc@rediffmail.com

Abstract

The present $KMgCl_3$ phosphor has been synthesized through wet chemical synthesis (WCS), solid state diffusion (SSD) and Hispersed centrifuge (HC) routes in the same atmospheric conditions and characterized for luminescence properties. XRD's of the sample prepared by all methods have been placed at the same position, phase and matched well with standard data. The particle size of 20 nm of $KMgCl_3$ by Hispersed centrifuged method was detected using transmission electron microscope (TEM). The PL emission spectra have been observed for Ce^{3+} at 353 nm and 375 nm due to $5d \rightarrow 4f$ transition, The presented phosphors are excited in the range of 300 nm to 400 nm which is mercury free excited range. Synthesis and photoluminescence spectra of trivalent Ce, rare-earths in $KMgCl_3$ are described for all routes for the first time in the present work. The CIE chromaticity coordinates were also calculated for $KMgCl_3$:Ce^{3+} phosphors, which are close to the NTSC standard values. $KMgCl_3$

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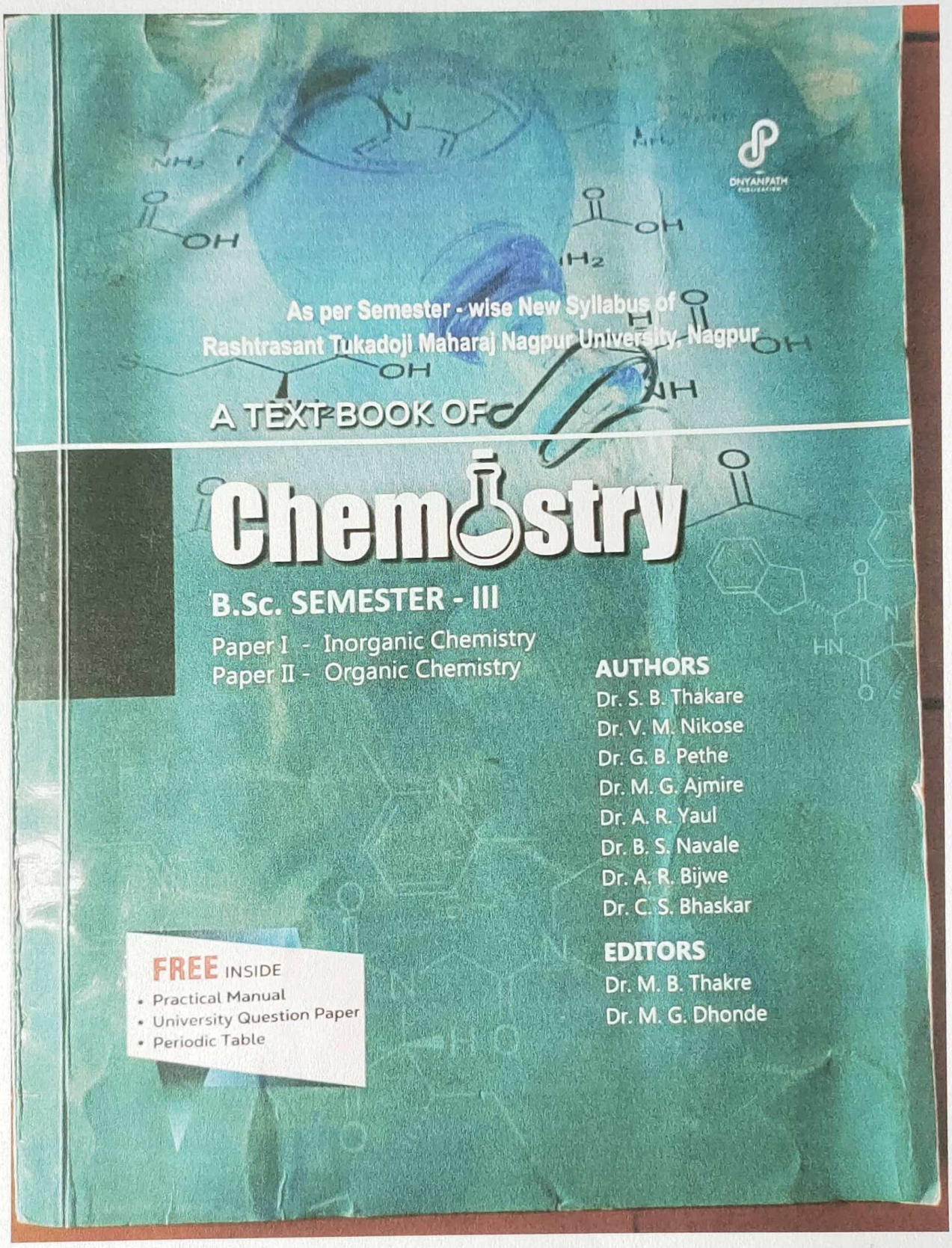

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UNIT I

A. VALENCE SHELL ELECTRON PAIR REPULSION (VSEPR) THEORY

VSEPR theory explains the structure and bonding in various molecules using the concept of bond pair and loan pair of electron. The structures of molecules like H_2O, NH_3, H_3O^+, NH_4^+, ClF_3 and SF_4.

According the this theory the geometry of a molecules based on bonding and non-bonding electron pairs in central atom which arrange in such a way to form minimum repulsion so that the molecule has maximum stability.

Nyholm and Gillespie have proposed the following rules to explain the bond angle and shape of some covalent molecule.

Rule 1:

If the central atom of a molecule is surrounded only by bonding electron pairs, the geometry of molecule will be regular.

e. g. $BeCl_2$– Linear BCl_3– Triangular

CH_4– Tetrahedral PCl_5– Trigonal bipyramidal

Rule 2:

When the central atom in a molecule is surrounded by both by bond pair and loan pair of electrons, the geometry of molecule will be distorted.

lp–lp > lp–bp > bp–bp

Rule 3:

Bond angle decrease with increase in electronegativity of bonded atoms.

PI_3	PBr_3	PCl_3
102°	101.5°	100°

Rule 4:

Bond angle increases with increase in electronegativity of central atom.

Rule 5:

Multiple bond does not affect the geometry of a molecule, bond angle in multiple bonds are generally larger than single bond.

H_2O Molecule:

- The electronic configuration of oxygen is; ${}_8O$ (G. S.) → $1s^2, 2s^2\ 2p_x^2\ 2p_y^1\ 2p_z^1$
- Oxygen undergo sp^3–hybridization with mixing and recasting of one $2s$ and three $2p$ orbitals and form four sp^3 hybrid orbital. Out of four sp^3 hybrid orbital, two containing unpaired electron form covalent bond with two hydrogen atom while two hybrid orbital acts as a loan pair.
- The numbers of valence shell electron pair are four out of which two are bond pair and two are loan pair.

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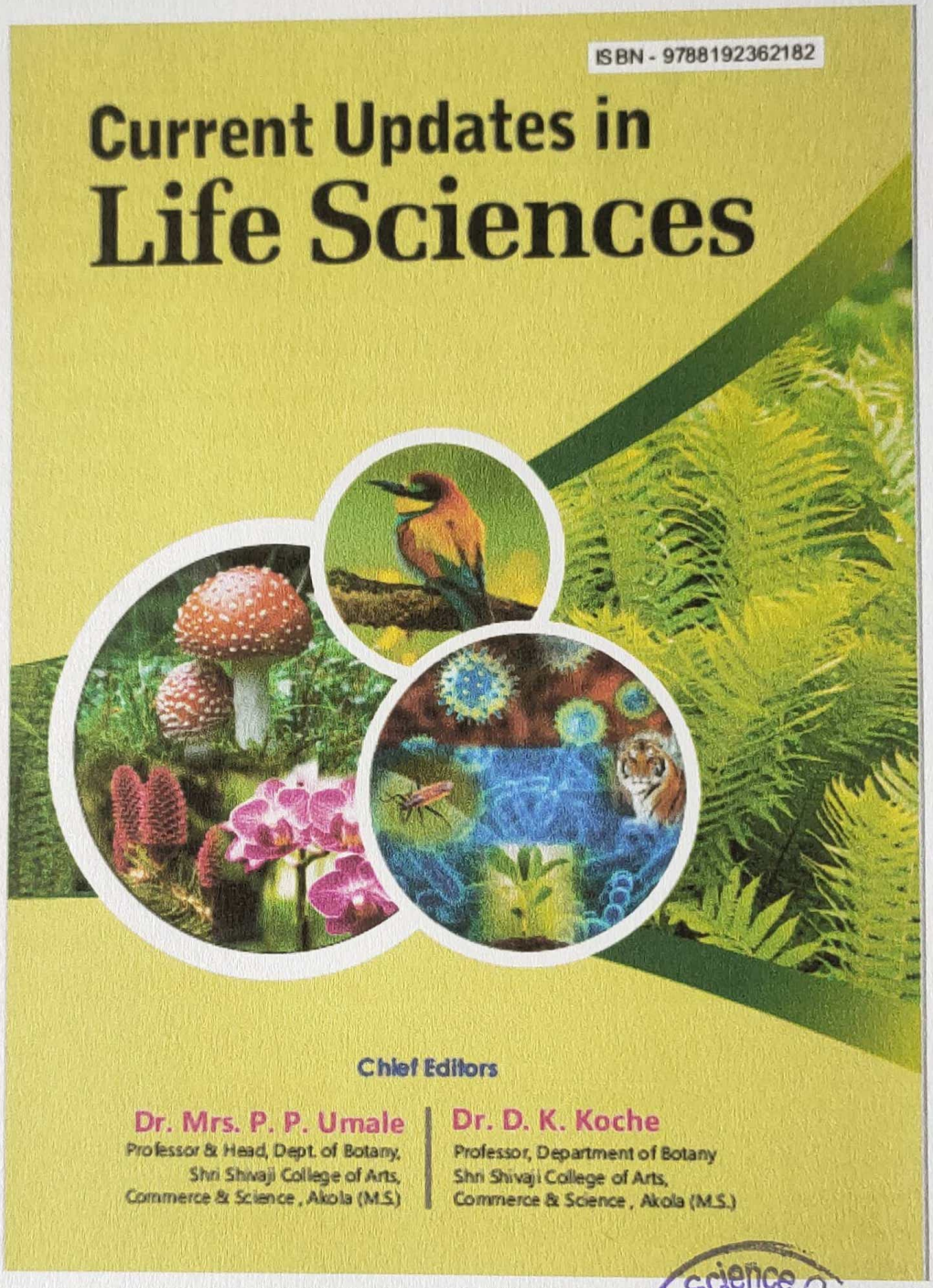

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ALGAE: SOURCE OF BIOFUEL

Lalita L. Sawarkar and Shaligram R. Hiwale
Department of Botany, K. Z. S. Science College Bramhani -Kalmeshwar, 441501
District- Nagpur (MS) India
Corresponding Author: lsawerkar5@gmail.com

ABSTRACT:

Energy crises are the biggest problem among the main problem in the world. In considering day to day need of fuel and its uses, it needs to search for renewable other energy sources. In this study, an attempt is made to extract oil from algae and its conversion into biodiesel. We recorded the oil contents (7.13%) in *Oscillatoria ornate*, (2.9%) in *Lyngbya* Sp..(8.37%) in *Spirogyra* Sp. (2.04%) in mixture of *Pithophora* Sp., *Spirogyara* Sp. and *Zygnema* Sp., (3.8%) in Mixture of *Pithophora* Sp., *Spirogyra* Sp. and *Mougotia* Sp.

Keywords: Algae, Biofuel, Biodiesel, algal oil, renewable energy

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Biochemical Composition Of Some Cyanobacteria

Lalita L.Sawarkar[1]* and Supriya B. Gedam[2]

1 K.Z.S.Science College Bramhani-Kalmeshwar,(Maharashtra). India 441501

2 Shri. Pundlik Maharaj Mahavidyalaya, Nandura (rly).Dist.Buldana

ABSTRACT

Cyanobacteria are most commonly useful organism, storing reserve food in the form of cyanophycean starch, protein, lipids and vitamins. These sources can be used as the biochemical constituents of *Spirulina platensis*, *Scytonema*sp., *Phormidium*sp. and *Oscillatoria* sp.isolated from Nagpur and Wardha. The biochemical constituents were analyzed in the term of total carbohydrates, total protein and total lipid contents. The analysis showed that maximum amount of total carbohydrate in *Scytonema*sp.(35 % dry weight) and minimum in *Phormidium*sp.(2.1% wet basis).The maximum amount of total protein in *Spirulina platensis*(60% Dry weight)and minimum in*Scytonema* sp.(12.50 %wet basis).The maximum amount of total lipid present in *Phormidium* sp.(11.83% dry weight)and minimum in *Oscillatoria* sp.(3%dry weight).

Key words: Cyanobacteria,*Phormidium*, *Scytonema*, *Oscillatoria*, *Spirulina platensis*, Biochemical composition

1.Introduction:

Cyanobacteria(blue –green algae, BGA) are morphologically diverse group of phototrophic prokaryotes, which occur in almost every habitat on earth and useful to mankind in various ways (Thajuddin and Subramanian, 2005).They constitute a vast potential resource in varied applications such as food,feed,fuel,fertilizer,medicine,industry and in combating pollution(Thajuddin and Subramanian, 2005).

Until past few decades of research, Cyanobacteria were of academic interests and were mostly ignored as nuisance but, now are proved as potential organisms for much biotechnological utilization(Richmond 1990; Thajuddin and Subramanian 2005).The interest in these organisms as generators of pharmacologically active and industrially important compounds has been stimulated by recent results(Singh *et al*.,2002). Algal protein either as a supplement or as an alternative source has received worldwide attention. Cyanobacteria are cultivated for a health food in the form of single cell proteins mainly from species of Spirulina which are mass cultivated globally (Lee *et al*.,1995). Spirulina is used as food supplement because of its excellent nutrient composition and digestibility.

Various microalgae have been considered as unconventional source of protein and microalgae are also source of essential amino acids. Carbohydrates in microalgae are in the form of starch, glucose or other polysaccharides and have high digestibility (Becker,2004).Some microalgae are rich sources of omega 3 and omega 6 families of fatty acids.(Tonon*et al*.,2002). By referring the utility of cyanobacteria in our work an attempt is down to know biochemical composition some cyanobacteria.

2. Materials and Methods

2.1 Materials: The raw material employed in the experiments of *Spirulina platensis*,*Phormidium*sp., *Scytonema*sp. and *Oscillatoria*sp collected from aquatic bodies of

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6. Dr. U. B. Mahatme and Dr. Mrs. A. H. Rangari (2020-21)

Detailed Study on the Effect of Oxidant, Dopant and MO Additive Loading on Morphology, Conductivity and Dielectric Constant of 3D Conducting Polymer PPy/\(\alpha\)-Fe2O3 Nanocomposites

U. B. Mahatme ; R. S. Gedam ; G. D. Tidke ; R. D. Utane ; A. H. Rangari

Advanced Aspects of Engineering Research Vol. 6, 7 May 2021, Page 140-155
https://doi.org/10.9734/bpi/aaer/v6/7756D
Published: 2021-05-07

Abstract

Conducting polymer (CP) polypyrrole (PPy) and their nanocomposites (NCs) with metal oxide \(\alpha\)-Fe_2O_3 (CP/MO) are synthesized by in situ chemical oxidation polymerization using various oxidants and dopants by keeping different molar percentage of MO with monomers. The prepared CPs and their CP/MO NCs PPy/\(\alpha\)-Fe_2O_3 are characterized by FTIR. Their morphology has studied by SEM and TEM techniques. Presence of identity bonds on the FTIR spectrograms ensures the formation of CPs and their NCs. SEM images show the presence of nearly spherical nanoparticles (NPs) on surface of CP and its composites. TEM images show the presence of NPs embed polymer net having thickness below 20 nm in PPy and, nanocluster/nanorods/nanosheets embed polymer chain of spherical NPs in composites. PPy/\(\alpha\)-Fe_2O_3. The room temperature ac conductivity (\(\sigma\)$_{ac}$) and dielectric constant (\(\epsilon\)) against frequency in the range 1 Hz to 40 MHz has measured using computer control impedance analyzer. The increment in ac conductivity (\(\sigma\)$_{ac}$) of CP and all its composites with rise in frequency assigned the quantum mechanical tunneling (QMT) in all materials under the present study and shows their polycrystalline disorder (amorphous and crystalline) structure. The IR bands, structure, morphology, \(\sigma\)$_{ac}$ and \(\epsilon\)′ shows dependence on type of oxidant, dopant and wt% of added MO. Oxidants and dopants show the remarkable and intense effect on the frequency response of ac conductivity and dielectric constant of the composites.

Keywords: Conducting polymer; polypyrrole; ferric oxide; hematite; nanocomposites; nanoparticles; nanocluster

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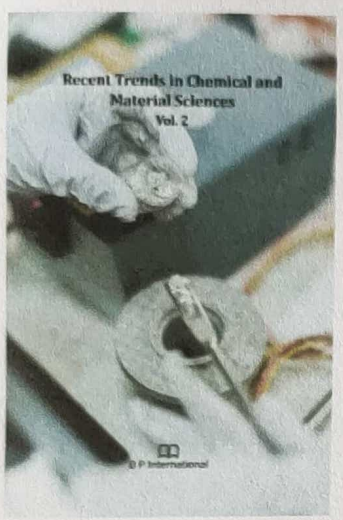

Conducting Polymer/Metal Oxide Nanocomposite's Morphology Dependence on MO Additive Weight Percent

U. B. Mahatme ; S. D. Thakre

Recent Trends in Chemical and Material Sciences Vol. 2, 4 August 2021, Page 67-73
https://doi.org/10.9734/bpi/rtcams/v2/1789C
Published: 2021-08-04

Abstract

By employing sulfuric acid as a dopant and APS as an oxidant, polyaniline Emeraldine salt (ES) and its composites with metal oxides V_2O_5, ZnO, and MgO were produced using a chemical oxidation approach by combining various mass percents of metal oxides with monomer in a polymerization mixture. SEM analysis was used to examine the morphological nano form and nano size of these composites.

Keywords: Polyaniline; metal oxides; morphology; chemical oxidation; vanadium pentoxide; zinc oxide; magnesium oxide

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Basics of Nanoscience, Nanomaterials and Nanotechnology

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Upendra B. Mahatme

Basics of Nanoscience, Nanomaterials and Nanotechnology, 17 July 2021, Page 1-74
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Published: 2021-07-17

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Abstract

With introduction to the present era of Nanoscience, nanomaterials, and nanotechnology, the first chapter of this book starts with the meaning of nano, nanoscale, and nanometer. The abstract of literature includes sections and subsections presented here as a sequential manuscript. In brief, how the materials can differ in bulk material and nanomaterial depending on the size of particles as building blocks has been explained by taking some examples. Remarkable changes in physical and chemical properties of the same material in its bulk and nanoform depending on particle size of material has been illustrated. The difference between nanoscience and nanotechnology has also been given. The reduction in particle size (dimensions) let's classify the nanomaterials as 3D, 2d, 1D and 0D materials. By defining properly with figures, it has been tried to classify nanomaterials. In the section of morphology, readers will find the literature on what morphology is, how morphology helps to classify the synthesized nanomaterials, and the importance of morphology for researchers and scientists to find the proper application field for synthesized nanomaterial. Brief introduction to electron microscopes, SEM and TEM, to examine the

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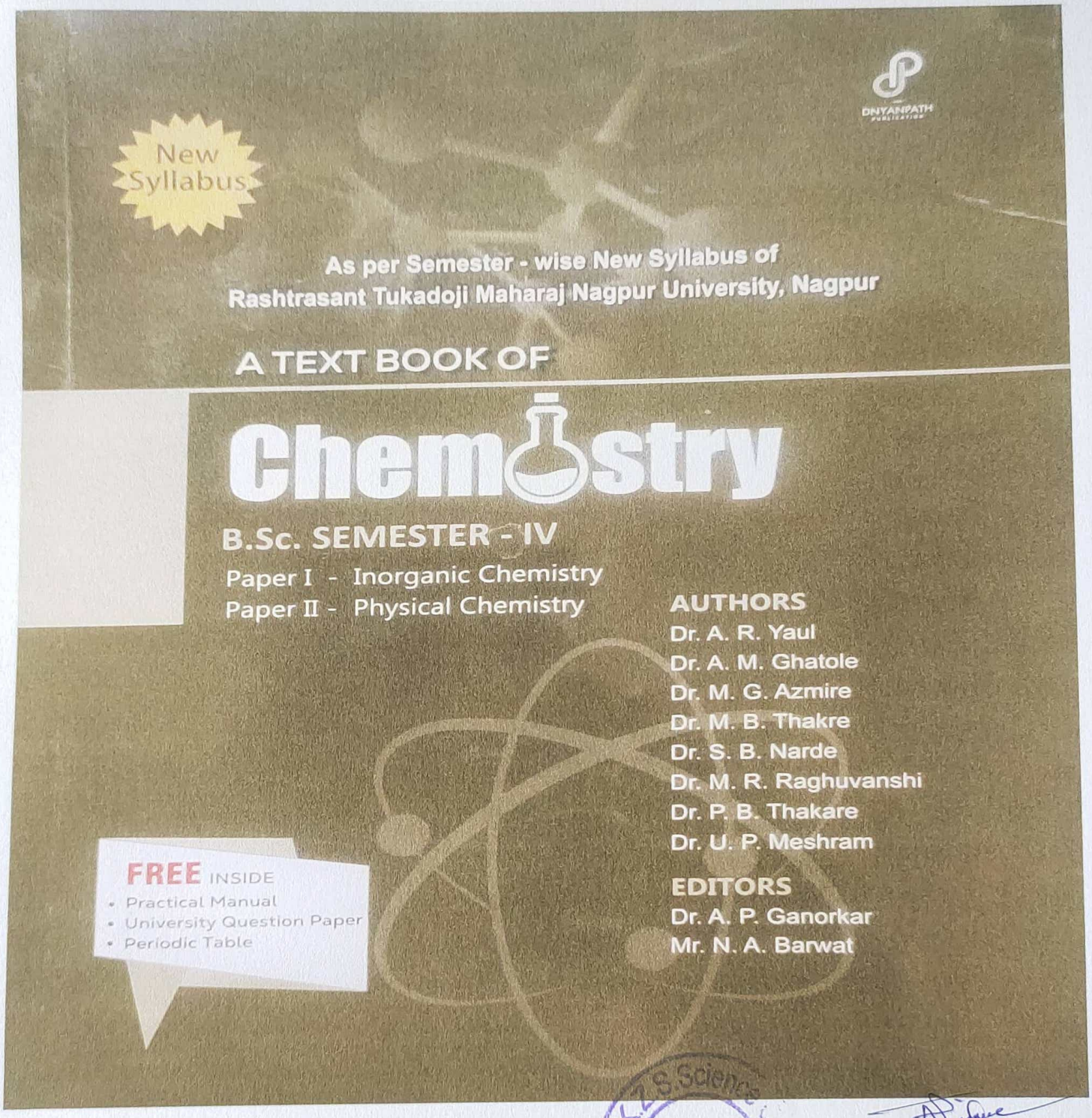

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UNIT I

COORDINATION COMPOUNDS

Coordination compounds are a special class of compounds in which the central metal atom is surrounded by ion or molecules with the help of coordinate bond. Thus compounds containing coordinate bonds are called as coordination compounds or complexes. These compounds are widely present in the minerals, plants and animals and play many important functions. Many biologically important compounds are coordination compounds, such as haemoglobin which is a coordination compound of iron, chlorophyll which is a coordination compound of magnesium, vitamin B_{12} which is a coordination compound of cobalt, etc.

Molecular or Addition Compounds:

Acid combines with base undergoes neutralization reaction to form salt and solvents.

$$HCl + NaOH \longrightarrow NaCl + H_2O$$

When solutions containing two or more salts in stoichiometric proportions are allowed to evaporate, crystals of new compounds are formed. These compounds are called as molecular or addition compounds.

Depending upon the behaviour of molecular compounds in aqueous solution they are classified into two types;

1) Double salt or lattice compounds
2) Coordination or complex compounds

1) Double Salts or Lattice Compounds:

Those molecular compounds which exist only in crystalline state, but break down into their individual ions when dissolved in water (other solvent) are called as double salts or lattice compounds.

Some well known double salts are

Mohr's salt - $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$

Potash alum - $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$

Carnallite - $KCl \cdot MgCl_2 \cdot 6H_2O$

Let us consider Mohr's salt. It is ferrous ammonium sulphate and is prepared by evaporating water from a solution containing ferrous sulphate and ammonium sulphate in equimolar proportion. Mohr's salt has different crystal structure than either ferrous sulphate or ammonium sulphate. This shows that it is different than these two in solid state. But when dissolved in water, it gives the ions in the same way as the individual constituents would have done. This is illustrated below.

Ionization of the two constituents [$FeSO_4$ and $(NH_4)_2SO_4$] forming Mohr's salt is

$$FeSO_4 \xrightarrow{aq.} Fe^{2+} + SO_4^{2-}$$

$$(NH_4)_2SO_4 \xrightarrow{aq.} 2NH_4^+ + SO_4^{2-}$$