



**ST ALPHONSA COLLEGE
OF ARTS AND SCIENCE**

Soosaipuram, Karinkal, Kanyakumari District,
TamilNadu, India - 629157



**CONFERENCE
PROCEEDINGS**

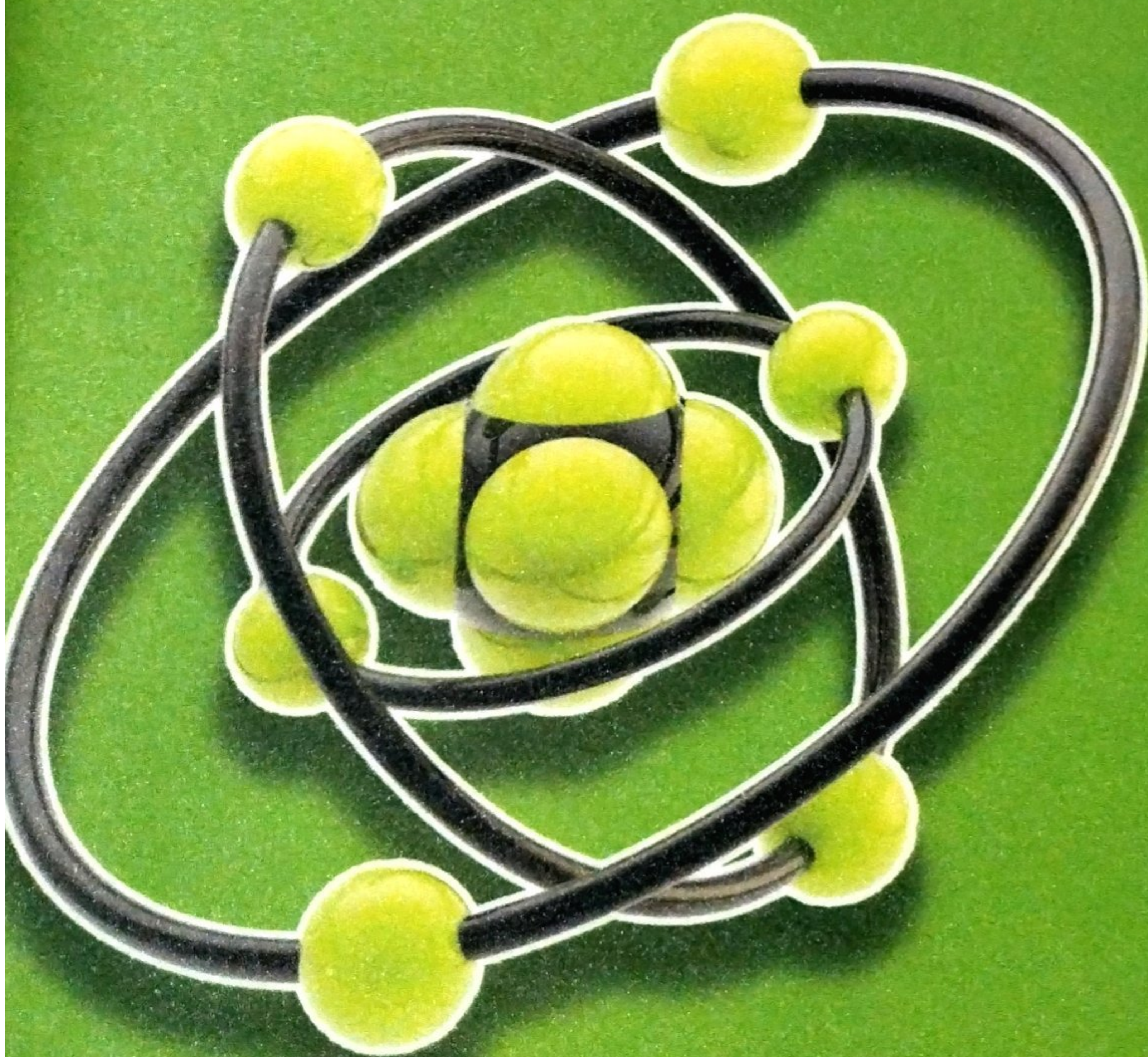
ICPMM - 2024

**INTERNATIONAL CONFERENCE ON PROSPECTIVE
OF MULTIFUNCTIONAL MATERIALS**

FEB 22-23, 2024

Organized By

RESEARCH AND PG DEPARTMENT OF PHYSICS



EDITED BY

Dr. P. H. SUDHARLIN PAUL

Dr. C. S. BIJU

Dr. S. K. REMMI

Dr. V. DONI PON

T ALPHONSA COLLEGE OF ARTS AND SCIENCE

Soosaipuram, Karinkal, Kanyakumari District,

Tamilnadu, India – 629157

ICPMM – 2024

**INTERNATIONAL CONFERENCE ON PROSPECTIVE OF
MULTIFUNCTIONAL MATERIALS**

FEB 22-23, 2024

Organized By

RESEARCH AND PG DEPARTMENT OF PHYSICS

EDITED BY

Dr. P. H. SUDHARLIN PAUL

Dr. C. S. BIJU

Dr. S. K. REMMI

Dr. V. DONI PON

75	CdO-NiO Nanocomposites Prepared by Ultrasonication Assisted Co-Precipitation Method for Elimination of Pharmaceutical Contaminants	93
	<i>Jenima J. J. Jasma Shalu, Antony Arokya Sangeetha Devi A, E.J. Vishaka and M. Priya Dharshini</i>	
76	Novel Adsorbent from Marine Crustacean: Metal-Impregnated Activated Carbon for Effective Dye Removal	94
	<i>N. Annlin Bezy, K. Francy, S. Jasvy and A. Lesly Fathima</i>	
77	Formation of Novel Morphologies of CuO Nanostructured Thin Films: Structural and Optical Properties	95
	<i>Sonia S. Penila Saminy, P. A. Ahashine and C. Anslin Jhony</i>	
78	High Pressure Phase Transition and Superconductivity in Lithium	96
	<i>Jeffy J and C. Nirmala Louis</i>	
79	Synthesis and Comparative study on the Catalytic Activity of undoped and Zinc doped Zirconium Dioxide nanoparticles	97
	<i>S. Jeba Jenifa and B. Helina</i>	
80	Needle-like novel ZnO-CuO Nanocomposites synthesized by Co-precipitation method for Photocatalytic applications	98
	<i>Jasma Shalu J, J. Jenima, A. Arokya Sangeetha Devi, E.J. Vishaka, M. Priya Dharshini</i>	
81	Investigation on Crystal Growth, Structural, Spectral, Hardness, NLO and Antibacterial Activity Studies of L-Leucine Barium Chloride Crystal	99
	<i>M. Arul Tresa and B. Helina</i>	
82	The Impact of Production Process on the Properties of Chitosan	100
	<i>Jasvy. S, N. Annlin Bezy, Merisha. M, S. Sebastiammal and A. Lesly Fathima</i>	
83	A Study on the Properties of Orange Peel Infused Epoxy Composite	101
	<i>M. S. Mallika, R. Asmitha, M. Herin, Jasvy. S, Merisha. M, S. Virgin Jeba, S. Sebastiammal and A. Lesly Fathima</i>	
84	A Study On Frequency Distribution Of Solar Flux And Correlation of sunspot Number With Solar Flux, Uv Flux, Tsi During Recent Solar Cycles	102
	<i>S. Mariya Shaniya and A. Iren sobia</i>	
85	Characterization and Anti microbial activity of green synthesized AgNPs using Fenugreek (Trigonella-Foenum) seed Extract	103
	<i>Jeni A and Begila David S</i>	
86	g-C ₃ N ₄ decorated Cr ₂ O ₃ nanostructures for the removal of crystal violet dye	104
	<i>D. A. Nayana, S. Nandakumar, Lolly Maria Jose, Arun Aravind and P. K. Manoj</i>	
87	An insight into experimental and theoretical studies on Biogenic synthesis of sauropus androgynus leaf extract mediated Ag-CdO nanocomposite as a potent tool against Mycobacterium tuberculosis	105
	<i>J. Jeni James and M. Amalanathan</i>	

• ID-P76

Novel Adsorbent from Marine Crustacean: Metal-Impregnated Activated Carbon for Effective Dye Removal

N. AnnlinBezy^{a*}, S. Francy^b, K. Francy^b, S. Jasvy^b and A. Lesly Fathima^b

^aReg No 20213042132006, Research Scholar, Research Department of Physics, Holy Cross College, Nagercoil

^bDepartment of Chemistry, Holy Cross College, Nagercoil.

(Affiliation to Manonmaniam Sundararar University, Tirunelveli)

*Corresponding author: annlinphysics@gmail.com

Abstract:

Activated carbon (AC) is a valuable material that is utilized in multiple sectors owing to its versatility and ability to effectively absorb various types of compounds. Its adsorption characteristics are due to a large surface area and extensive porous network. Metal impregnation into activated carbon is for the improvement of its adsorption capacity and the eliminating of specific contaminants like heavy metals, organic pollutants, or gases assessing with long-term performance. Initially, the chitosan was derived from shrimp shells and has the property of dye adsorption. The precursor chitosan was then reformed into Activated carbon (AC) by pyrolysis at 450°C. The XRD of produced AC shows its characteristics peak at 26.6°. Field Emission Scanning Electron Microscopy (FESEM) of the AC showed the porous surface. Aluminium (Al), Iron (Fe), and Silver (Ag) were incorporated into the activated carbon individually by simple chemical method, at low temperatures. The structural investigation results give the Ag-imposed AC forms in a polycrystalline phase with crystallite size in the nanoscale. FTIR data of metal-imposed AC prove that chemical modification occurs in activated carbon by the inclusion of metals. The adsorption of Rhodamine 6G and Amaranth dyes by AC/Al, AC/Fe, and AC/Ag were investigated by UV analysis. The result of this work shows, about 47% concentration of Amaranth dye was adsorbed by AC/Al composite, and to the maximum 21% of Rhodamine was adsorbed by AC/Ag sample in an experiment time of 10 hours.

Keywords: Activated Carbon; Dye Adsorption; Porosity; Metal; Shrimp shell

References

1. S. A. Qamar, M. Ashiq, M. Jahangeer, A. Riasat, and M. Bilal, "Chitosan-based hybrid materials as adsorbents for textile dyes—A review," *Case Stud. Chem. Environ. Eng.*, vol. 2, p. 100021, Sep. 2020.
2. S. Bakhita et al., "Functional activated carbon: from synthesis to groundwater fluoride removal," *RSC Adv.*, vol. 12, no. 4, pp. 2332–2348, 2022.
3. N. Byamba-Ochir, B. Buyankhishig, N. Byambasuren, and E. Surenjav, "Characterization of Silver Loaded Activated Carbon Prepared under Supercritical Water Condition," *Solid State Phenom.*, vol. 288, pp. 59–64, Mar. 2019, doi: 10.4028/www.scientific.net/SSP.288.59.
4. S. Phoemphoonthanyakit, P. Seeharaj, P. Damrongsak, and K. Locharoenrat, "Effect of Adsorption Characteristics of Rhodamine 6G Dye Solution in Fe 3 O 4 Magnetic Nanoparticles on Fluorescence Quantum Yield," *J. Spectrosc.*, vol. 2019, pp. 1–5, Jul. 2019, doi: 10.1155/2019/2853989.

▪ ID-P76

Novel Adsorbent from Marine Crustacean: Metal-Impregnated Activated Carbon for Effective Dye Removal

N AnnlinBezy^{a*}, K Francy^b, S. Jasvy^b and A Lesly Fathima^b

^aReg No 20213042132006, Research Scholar, Research Department of Physics, Holy Cross College, Nagercoil

^bDepartment of Chemistry, Holy Cross College, Nagercoil.
(Affiliation to Manonmanium Sundararnar University, Tirunelveli)

*Corresponding author: annlinphysics@gmail.com

Abstract:

Activated carbon (AC) is a valuable material that is utilized in multiple sectors owing to its versatility and ability to effectively absorb various types of compounds. Its adsorption characteristics are due to a large surface area and extensive porous network. Metal impregnation into activated carbon is for the improvement of its adsorption capacity and the eliminating of specific contaminants like heavy metals, organic pollutants, or gases assessing with long-term performance. Initially, the chitosan was derived from shrimp shells and has the property of dye adsorption. The precursor chitosan was then reformed into Activated carbon (AC) by pyrolysis at 450°C. The XRD of produced AC shows its characteristics peak at 26.6°. Field Emission Scanning Electron Microscopy (FESEM) of the AC showed the porous surface. Aluminium (Al), Iron (Fe), and Silver (Ag) were incorporated into the activated carbon individually by simple chemical method, at low temperatures. The structural investigation results give the Ag-imposed AC forms in a polycrystalline phase with crystallite size in the nanoscale. FTIR data of metal-imposed AC proves that chemical modification occurs in activated carbon by the inclusion of metals. The adsorption of Rhodamine 6G and Amaranth dyes by AC/Al, AC/Fe, and AC/Ag were investigated by UV analysis. The result of this work shows, about 47% concentration of Amaranth dye was adsorbed by AC/Al composite, and to the maximum 21% of Rhodamine was adsorbed by AC/Ag sample in an experiment time of 10 hours.

Keywords: Activated Carbon; Dye Adsorption; Porosity; Metal; Shrimp shell

References

1. S. A. Qamar, M. Ashiq, M. Jahangeer, A. Riasat, and M. Bilal, "Chitosan-based hybrid materials as adsorbents for textile dyes—A review," *Case Stud. Chem. Environ. Eng.*, vol. 2, p. 100021, Sep. 2020.
2. S. Bakhta et al., "Functional activated carbon: from synthesis to groundwater fluoride removal," *RSC Adv.*, vol. 12, no. 4, pp. 2332–2348, 2022
3. N. Byamba-Ochir, B. Buyankhishig, N. Byambasuren, and E. Surenjav, "Characterization of Silver Loaded Activated Carbon Prepared under Supercritical Water Condition," *Solid State Phenom.*, vol. 288, pp. 59–64, Mar. 2019, doi: 10.4028/www.scientific.net/SSP.288.59.
4. S. Phoemphoonthanyakit, P. Seeharaj, P. Damrongsak, and K. Locharoenrat, "Effect of Adsorption Characteristics of Rhodamine 6G Dye Solution in Fe₃O₄ Magnetic Nanoparticles on Fluorescence Quantum Yield," *J. Spectrosc.*, vol. 2019, pp. 1–5, Jul. 2019, doi: 10.1155/2019/2853989.