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ICPMM - 2024

INTERNATIONAL CONFERENCE ON PROSPECTIVE OF MULTIFUNCTIONAL MATERIALS

FEB 22-23, 2024

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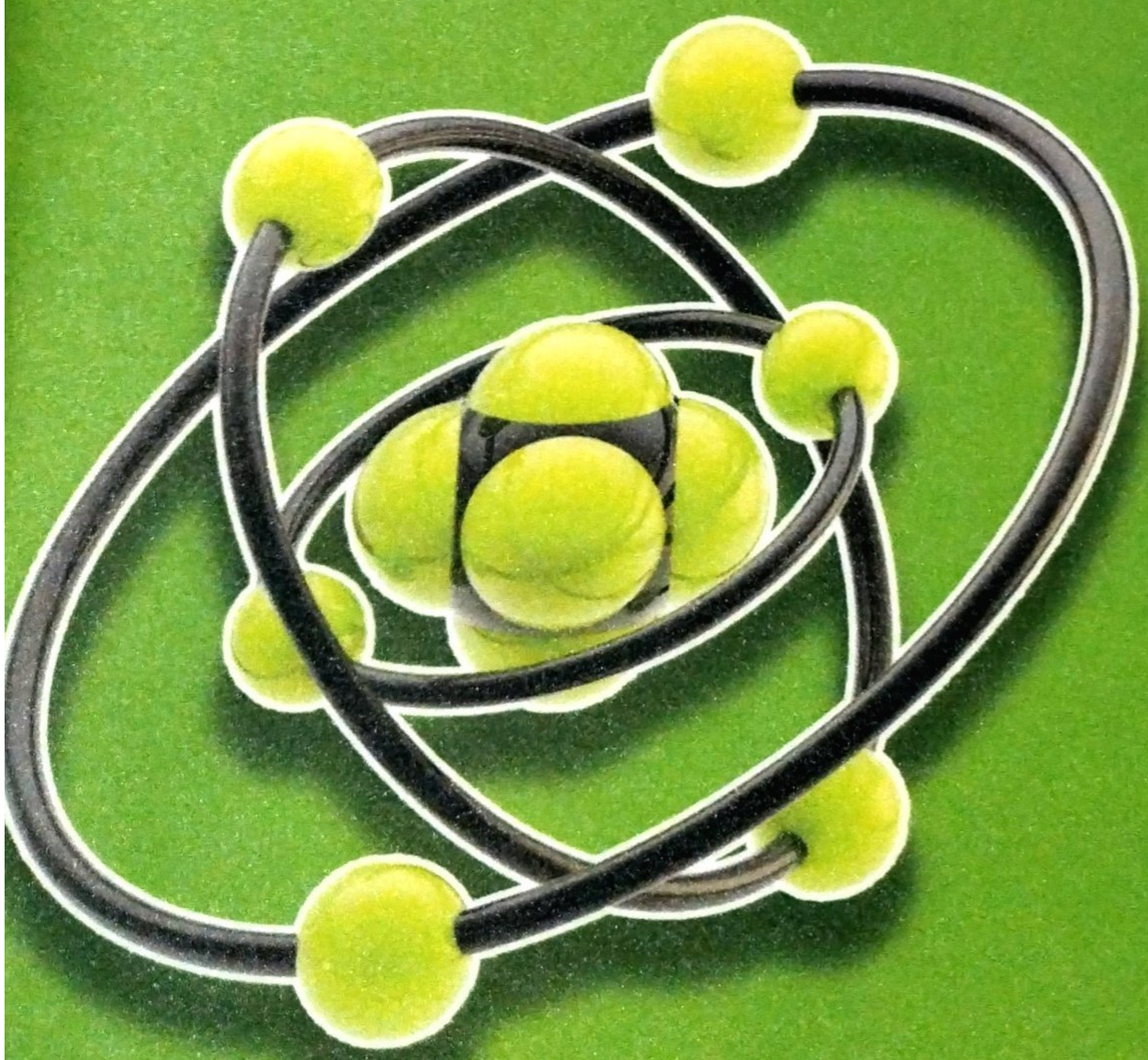

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- **ID-P76**

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

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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 aredue 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 theAC showedthe 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 ACprovesthat 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 resultof 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 Fe 3 O 4 Magnetic Nanoparticles on Fluorescence Quantum Yield," J. Spectrosc., vol. 2019, pp. 1–5, Jul. 2019, doi: 10.1155/2019/2853989.

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