

Frontiers in Pharmaceutical, Material, and Environmental Sciences: Innovative Approaches and Applications

Editors

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Published by: - Book Rivers

Website: - <https://www.bookrivers.com>

Email: publish@bookrivers.com

1st Print Edition - 2026

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Title: *Frontiers in Pharmaceutical, Material, and Environmental Sciences: Innovative Approaches and Applications*

Editors: *Tahmeena Khan, Qazi Inamur Rahman, Nafees Ahmad, Shahla Tanveer*

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ISBN: 978-93-6884-630-7

MRP: 370/-INR

(Printed in India)

PREFACE

This book brings together a collection of research studies that delve into the fields of pharmaceutical science, materials science, and environmental science. The chapters within this volume highlight innovative methods and significant discoveries in these areas. The research presented here explores the development of advanced drug delivery systems, the therapeutic potential of natural products, the removal of environmental pollutants, and the optimization of material properties. By combining experimental techniques with computational modeling, the authors have gained deeper insights into the underlying mechanisms of these processes. We hope this book will serve as a valuable resource for researchers, academics, and industry professionals in these fields. The knowledge and insights provided here will contribute to the advancement of scientific research and the development of sustainable solutions for global challenges.

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Chapter – 6

Fabrication, characterization and adsorption kinetics of Polyaniline towards organic pollutant

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Abstract

Polyaniline (PANI) was synthesized through efficient polymerization process of aniline monomer in an acidic medium. The structural properties of PANI were thoroughly characterized using X-ray diffraction (XRD) to confirm the formation of the polymer and assess its crystallinity. To evaluate the adsorption performance of PANI, methylene blue (MB), a commonly used dye, was employed as the adsorbate. A series of adsorption experiments were conducted to investigate the adsorption kinetics and equilibrium isotherms of PANI. The results showed that the adsorption kinetics of PANI followed both the pseudo-first and pseudo-second-order models, indicating that the adsorption process involved both physical and chemical interactions. These findings demonstrate that PANI is a promising, effective, and cost-efficient adsorbent material for the removal of dyes from aqueous solutions.

Keywords: PANI, methylene blue, adsorption, dye

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