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SDG-6

PREFACE

Water is essential requirement of life. If water is pure it can sustain lifeforms on the other aspect, polluted water is the cause of disaster. UN SDG 6 promotes 'Clean Water and Sanitation' ensuring access to water and sanitation for all. All stakeholders of society are having the fundamental rights to access this resource in easily accessible and clean form. Also the society must ensure the water as resource must not be polluted by human activities. Wastage must be eradicated. At present, it is becoming very difficult to obtain sufficient quantity and good quality water. All this is due to unscientific usage. Also the resource is continuously diminishing at various sources and going out of access to certain sections of society. So it is our duty to ensure the sustainability of water through pollution mitigation, judicious usage and environmental awareness. DIT University promotes this objective through its policy of sustainable water usage, reuse of waste water, conservation principle and promoting same through research and outreach activities.

DIT University

Report

CONTENTS

DIT University
Report

University's research activities at Regional, National and Global Level on Water

DIT University through its centers of Excellence is extensively involved in research activities at global, national and regional scale with Government agencies and National, International Institutes of eminence for collaborative research on water issues and developing technological solutions.

Global Level:

Dr. Ravi Shukla, Department of Physics, DIT University through Center of Excellence in Advanced Functional Smart Materials Lab has research collaboration with **Prof. Achintya N Bezbaruah,** Nanoenvirology Research Group, Civil, Construction and Environmental Engineering, North Dakota State University, Fargo, North Dakota 58105, USA

The research Objective: Water treatment with advanced technology

The research outcome of the Collaboration:

Chamoli, P., Shukla, R. K., Bezbaruah, A. N., Kar, K. K., & Raina, K. K. (2021). Rapid microwave growth of mesoporous TiO2 nano-tripods for efficient photocatalysis and adsorption. *Journal of Applied Physics*, *130*(16).

Chamoli, P., Shukla, R. K., Bezbaruah, A. N., Kar, K. K., & Raina, K. K. (2021). Microwave-assisted rapid synthesis of honeycomb core-ZnO tetrapods nanocomposites for excellent photocatalytic activity against different organic dyes. *Applied Surface Science*, *555*, 149663.

National Level

Dr. Tarumay Ghoshal, from Center of Excellence in Land, Air and Water (Environmental Sustainability), DIT University has received a sponsored research funded project from **Science and Engineering Research Board (SERB), Department of Science and Technology, Government of India in 2018 which was functional till September 2021.**

DIT University

Report

Project Title: Implication of data assimilation for identifying short scale variations in various biogeochemical characteristics in the Bay of Bengal through Regional Ocean Model Simulations

Project Cost: INR 1556000

Research Outcomes:

Ghoshal, T., & Chakraborty, A. (2021, December). Regional Ocean Modeling System (ROMS) Simulations to Identify the Sensitivity of Forcing Conditions on the Thermohaline Features of the Bay of Bengal. In *International conference Sustainable Environmental Engineering and Science* (pp. 33-43). Singapore: Springer Nature Singapore.

Ghoshal, T., & Chakraborty, A. (2019). Response of quick scatterometer wind forcing on the ROMS simulation during 'MALA' cyclone.

DIT University
Report

Dr. Jabrinder Singh, from Center of Excellence in Land, Air and Water Water (Environmental Sustainability), DIT University has received a sponsored research funded project from **Uttarakhand State Council for Science and Technology on 15.03.2021 for one year**.

The project title:

"Appraisal of environmental streamflow of Rispana with reference to spatio-temporal variation of water quality index and catchment potential"

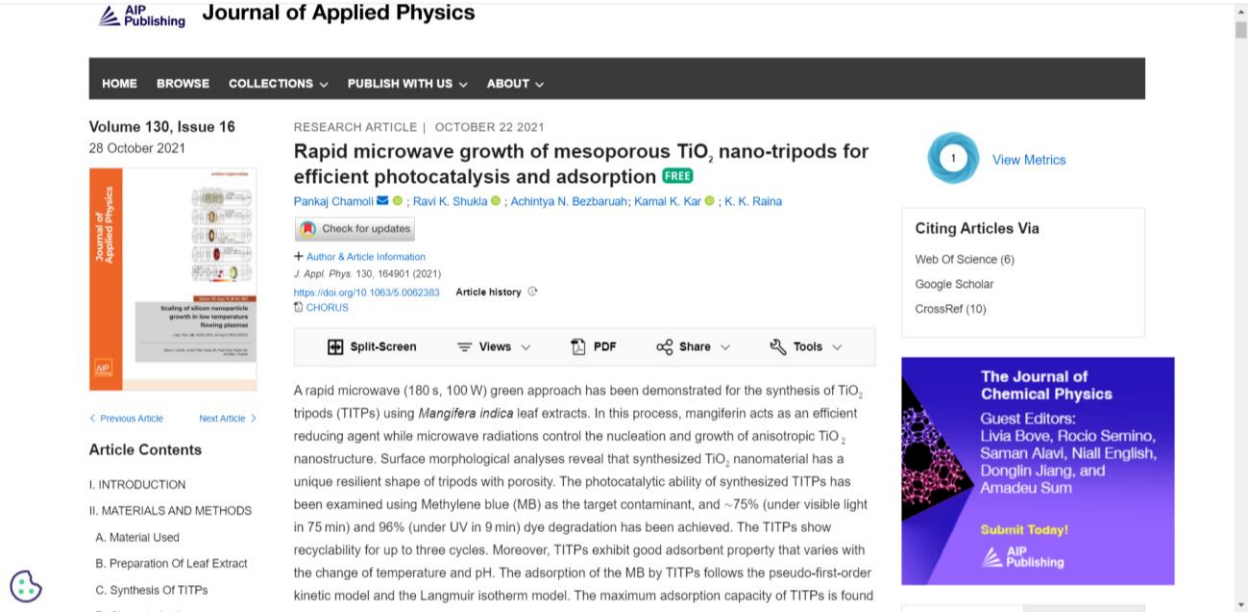
Project Cost: INR 404000

At Regional and Local level:

Center of Excellence in Land, Air and Water (Environmental Sustainability) and Department of Civil Engineering is jointly working with Uttarakhand Pollution Control Board (UKPCB) on water quality parameters on River Ganga and its tributaries.

Joint Research: **Mr. Sarada Prasanna Subudhi**, official from UKPCB is pursuing PhD in the department of Civil Engineering, DIT University (**Roll No: 198170002**).

Research Publications



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Rapid microwave growth of mesoporous TiO_2 nano-tripods for efficient photocatalysis and adsorption FREE

Pankaj Chamoli ; Ravi K. Shukla ; Achintya N. Bezbaruah; Kamal K. Kar ; K. K. Raina

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J. Appl. Phys. 130, 164901 (2021)

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I. INTRODUCTION

II. MATERIALS AND METHODS

A. Material Used

B. Preparation Of Leaf Extract

C. Synthesis Of TITPs

A rapid microwave (180 s, 100 W) green approach has been demonstrated for the synthesis of TiO_2 tripods (TITPs) using *Mangifera indica* leaf extracts. In this process, mangiferin acts as an efficient reducing agent while microwave radiations control the nucleation and growth of anisotropic TiO_2 nanostructure. Surface morphological analyses reveal that synthesized TiO_2 nanomaterial has a unique resilient shape of tripods with porosity. The photocatalytic ability of synthesized TITPs has been examined using Methylene blue (MB) as the target contaminant, and ~75% (under visible light in 75 min) and 96% (under UV in 9 min) dye degradation has been achieved. The TITPs show recyclability for up to three cycles. Moreover, TITPs exhibit good adsorbent property that varies with the change of temperature and pH. The adsorption of the MB by TITPs follows the pseudo-first-order kinetic model and the Langmuir isotherm model. The maximum adsorption capacity of TITPs is found

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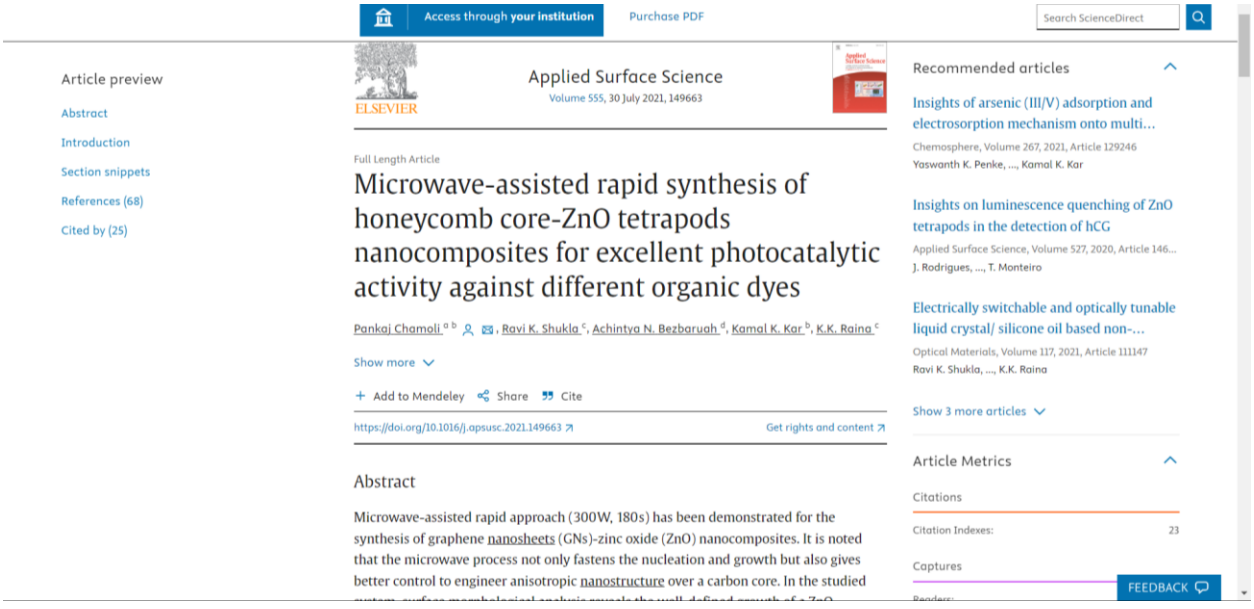

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ELSEVIER Applied Surface Science
Volume 555, 30 July 2021, 149663

Full Length Article

Microwave-assisted rapid synthesis of honeycomb core-ZnO tetrapods nanocomposites for excellent photocatalytic activity against different organic dyes

Pankaj Chamoli [a b], Ravi K. Shukla [c], Achintya N. Bezbaruah [d], Kamal K. Kar [b], K.K. Raina [c]

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Abstract

Microwave-assisted rapid approach (300W, 180s) has been demonstrated for the synthesis of graphene nanosheets (GNs)-zinc oxide (ZnO) nanocomposites. It is noted that the microwave process not only fastens the nucleation and growth but also gives better control to engineer anisotropic nanostructure over a carbon core. In the studied

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Regional Ocean Modeling System (ROMS) Simulations to Identify the Sensitivity of Forcing Conditions on the Thermohaline Features of the Bay of Bengal

Tarumay Ghoshal & Arun Chakraborty

Conference paper | First Online: 26 April 2023

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Abstract

The Bay of Bengal (BOB) is known for prominent seasonal and annual climatic variability. The bay is locked from three directions, north, east, and west, and open to the Indian Ocean from the southern direction. BOB experiences local and remote effects in its thermohaline features. The BOB always has a higher surface temperature (SST) compared to the Arabian Sea which can be observed from basin average SST values. The semiannual signal in those SST values shows higher than 26 °C. The basin is very much prone to various categories of cyclones which are known to cause prominent upwelling and mixing in the basin. However, most of the times, satellite data cannot track the thermohaline changes within a short period of time due to poor temporal and spatial resolutions and that too only limited to the surface, not below it. Moreover, in situ data are not sufficient or not present at the required locations to provide the data for the particular event. The same situation is also prevalent for remote effects when Indian Ocean Dipole (IOD) and El Nino-Southern Oscillation (ENSO) events create surface-to-subsurface thermohaline variability. Therefore, these problems can be tackled through numerical modeling where a realistic initial condition will provide much more accurate results within a short time gap. To meet this objective, Regional Ocean Modeling System (ROMS) is set up for BOB with a climatological run. In addition, forcing conditions and initial conditions are adopted for specific events like IOD, ENSO, or cyclones. Satellite-derived wind velocity

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Impact Examination of the Lockdown on the Status of the Heavy Metal Pollution Index and Health Risk of Ganga River Water Quality

Sarada Prasanna Subuddhi[1], Ankur Kansal[1], Prashant Pandey[1], Tarumay Ghoshal[2,†], Naveen Singhal[3]

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[3]Center of Excellence in Land, Air and Water (LAW), Department of Chemistry, DIT University, Dehradun, Uttarakhand- India

[†]Corresponding author: E-mail: tarumay.iit@gmail.com, Tel: +91 9333168391, Fax:

Received September 6, 2022 Revised November 29, 2022 Accepted December 25, 2022

Abstract

Ganga River is the lifeline for socio-economic development of India. The unlimited desire of human and anthropogenic activities degraded the water quality of Ganga River, especially in Haridwar. The present study investigated the significant impact of lockdown on physio-chemical status of the Ganga River in Haridwar. Study also revels the significant augmentation

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Recent Trends of Temporal and Spatial Variation in Waste Generation and Its Impacts on River Water Quality: Special Emphasis on Suswa and Song Rivers of Uttarakhand

S. P. Subudhi, Ankur Kansal, Tarumay Ghoshal, Naveen Singhal & Damini Rana

Conference paper | First Online: 25 April 2023

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Abstract

Survival and procreation of life on the planet is dependent on the water resources. Water being an unreplaceable vital resource sustains life of the species, ecological processes, agricultural and other developmental activities. A watershed is a natural structure for developing efficient utilization of precipitation that fluctuates spatially and temporally. Around 80% of untreated waste in the world is disposed from domestic and industrial sources which is creating a threat to living organisms. Different sampling sites were studied in Doon valley for a period of one year. Parameters chosen for the study are: Physicochemical parameters—pH, electrical conductivity, total hardness; Biological parameters—dissolved oxygen, biological oxygen demand; Bacterial pollution indicator parameters—total coliforms; Pesticides—Benzene hexachloride and endosulfan. According to the findings, there are significant deviations between different sites and parameters chosen. Water quality has been found to be

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