

Reflections

BSE / Rf - 5

... In focus for better tomorrow

Department NewsLetter

November-2021-22 Odd sem

Highlights – November

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Activities Conducted

A Cordial Welcome to the new tutors of the Department

For Internal Circulation

Department of Basic Science Engineering & Humanities

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About the Department



Dr. Nalinakshi N

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Professor & Head,
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The department of Basic Sciences Engineering and Humanities is a first rostrum all the aspiring engineers step on to. It strongly believes that knowledge is the base of all basic sciences and it strives to achieve this power to its best. This Department is devoted to foster the fundamental principles and understanding of Science to enhance the students' basic knowledge of Engineering. It offers excellent introductory courses in Mathematics, Physics, Chemistry and English which will both instruct and stimulate students in all of the University's programs. The department believes that engineers are a significant source of technological innovation and expertise. To achieve this belief, the department continuously fosters students to focus on their brainpower on solving problems through the application of science and mathematics, discovering new ways to make life better for the general public. Students are guided by well experienced and highly qualified faculty members who strive to improve the students learning, research and development processes. The "spark" of creativity is a hallmark of the department and it endeavor to create the same zest amongst all the budding engineers and this process is unceasing.

Webinars

1. Effective ways of Solving aptitude problems

Carrer Guidance Program –

Topic: “Effective ways of Solving Aptitude Problems”

Date: 28th Dec 2021

Speaker: Mr. Anil Nair

The Placement Cell of Atria IT had collaborated with the Department of Basic Sciences Engineering and Humanities in organizing a career guidance program titled “Effective ways of Solving Aptitude Problems” on 28th December 2021, for the first-year students. The main intention of the program was to help students tackle aptitude questions in various competitive examinations such as CAT, TOEFL, GATE, etc.

The event began with the speaker Anil Nair, helping students to understand the concept of having aptitude questions in competitive exams and also the various strategies to solve them. He had also given a clear picture of how aptitude questions are formulated and the simplest strategies one could use to solve them quickly. His way of handling the subject seemed to be more powerful as Sir had connected each problem with the daily real-life situations and inspired students to study every subject with logic.

The speaker had quoted several repeated aptitude questions from various competitive exam papers and helped students to solve them easily. Students actively engaged themselves in the teaching-learning process and found the session to be effective. A feedback was taken from the students who claimed that such sessions might be held on a regular basis and it will definitely be helpful to crack any exam.

2. Pathway to Professional Excellence

Speaker: Mr. Anil Pandit

Topic: “Pathway to Professional Excellence”

Date: 12th April 2022

The Department of Basic Sciences Engineering and Humanities had organized a Guest Lecture on the topic “Pathway to professional Excellence” by the speaker “Mr. Anil Pandit”, the MRC of the Atria IUCEE chapter on 12th of April 2022

The event was conducted in the seminar hall at 10:45 am and all the faculties and students attended the webinar. All teachers gained a lot of information which helps students to think divergently and implement different ideas in their learning

The poster is for a guest lecture titled "Pathway to Professional Excellence" by Mr. Anil Pandit, MRC, IUCEE. It is organized by the Department of Basic Science Engineering and Humanities at Atria Institute of Technology, Anandnagar, Bangalore - 560024. The event is part of the Indo Universal Collaboration for Engineering Education. The date is 12/04/2022 at 11 AM in Seminar Hall. The registration link is https://forms.gle/jaoGaCivgenFIRjss. The organizers are Jeslin G (Prof. BSE&H), Dr. Nalinakshi N (Prof. & Head BSE & H), and Dr. T N Sreenivasa (Principal, AIT).

Faculty Achievements

Hearty Congratulations to Prof. Venkateswarlu Dasari



VenkateswarluDasari

Published a paper in an international conference on the topic Micromagnetic Reversal Study in Permalloy Cylindrical Nanowires with Diameter Modulations.

Registration number: ICAMMC 2021 - 911
Micromagnetic Reversal Study in Permalloy Cylindrical Nanowires with Diameter Modulations
 P. B. Chhetri, S. K. Kamath, Venkateswarlu Dasari
 Department of Basic Science Engineering and Humanities, Atria Institute of Technology
 Bangalore-560024, India

Abstract
 In the recent past, magnetic nanowires are heavily being used for magnetic field sensing, memory storage applications [1, 2]. In most of these cases, the nanowires are fabricated by lithographic methods which leads to flat thin stripes instead of cylindrical wires. But there is an advantage if one can explore the third dimension of the magnetic vector by making the nanowires as cylindrical and tubes. The recent advancements in fabrication and synthesis methods demonstrate that the cylindrical magnetic nanowires can be prepared experimentally with precise control including the joints to make the nanowire network structures that promise novel applications in various sensing, storage and functional properties [3]. Other, it is very difficult to characterize such nanowires to know their internal domain structure in a normal lab setup. Micromagnetic simulations are proved to be handy in such cases.

In the present study, we report magnetization reversal process in cylindrical nanowires by using "Mumax3" micromagnetic solver. We have considered permalloy (NiFe) material with 4 micron length and 150 nm diameter as a uniform cylindrical nanowire (NW-A). Further, we varied the diameter around center as depicted in the graphical picture. Hysteresis results indicate NW-A switches at 15 mT where as NW-B and NW-C switches around 12.5 mT. NW-C possess a metastable state which we further analyzed by looking into spatial magnetic domain information. By using magnetic domain information, we have modeled the anisotropic magnetic resistance (AMR) to correlate our findings with related transport measurements [2,4].

Methods and Materials

- "Mumax3" micromagnetic solver is a GPU powered Finite Difference Software developed at the DelftRat group of Prof. Van Wazersege at Ghent University. [1]
- Permalloy (Ni-Fe-80-20) is a soft ferromagnetic material used in many magnetic based sensors and memory logic devices.
- We have used 4 micron length and 150 nm diameter as a uniform cylindrical nanowire (NW-A) as a reference sample to correlate with its modified versions with modulated diameter around center for about 250nm range as shown in the Fig.1(a).
- NW-B (NW-C) with a modified diameter of 250nm (150nm)

Results & Discussion

Fig. 1 Schematic of reference (a) and their corresponding hysteresis plots.

Fig. 2 Cross-sectional domain images for respective nanowires at various locations starting from left and right end and around the junction regions where the diameter modulates.

Conclusions

- We have used micromagnetic simulations tool to study the magnetization reversal process in diameter modulated cylindrical nanowires.
- Cross-sectional domain images indicates that the reversal mechanism is dominated by helical domain wall motion.
- The hope our study is helpful in considering the kind of cylindrical nanowires for the magnetic based futuristic memory and logic devices.

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4. Hwang, C. et al., "Magnetic Transport in Double-Stranded Helical Nanowires of Permalloy Nanowires", Scientific Reports, vol. 11, 2021, pp. 1-11.

Congratulations for VenkateswarluDasari sir had received individ FOR ENGINEERING EDUCATOR(IUCEE).

And also sir had received Certificate for Attending mini symposium on effective practices in teaching learning and also reviewing the papers.



Faculty Achievements Contd

Hearty Congratulations to Prof. Nagendra Naik K



Prof. Nagendra Naik K

Hearty congratulations to Prof. Nagendra Naik for successfully completing her Ph.D open Seminar-Online on the topic “A Study on Algebraic Signed Graphs”



Hearty Congratulations to Prof. Chethan P B



Prof. Chethan P B

Published a paper in an international conference on the topic EMI Shielding Properties of PVDF composites with NI-MWCNT and GCNF fillers.

Registration number: ICAMMC 2021 - 873

EMI shielding properties of PVDF composites with Ni-MWCNT and GCNF fillers

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²Department of Basic Science Engineering and Humanities, Alva Institute of Technology Bangalore, India.

Abstract
 Polymer composites with carbon fillers are extensively used for electromagnetic interference (EMI) shielding applications. The conductive composite of poly(vinylidene fluoride) (PVDF), multi-walled carbon nanotube (MWCNT) and graphitized carbon nanofiber (GCNF) were fabricated by melt mixing technique and are examined for EMI shielding properties. The electrical conductivity and EMI shielding of the composites were measured with increase in the amount carbon filler. The surface morphology and microstructure of the composites were studied using scanning electron microscopy (SEM) analysis. The parameters like EMI shielding effectiveness, attenuation constant and skin depth are discussed in the present paper over a frequency range of 0-10 GHz. The variation in the shielding of the composites are explained in the terms of reflective and absorptive mechanism of the measured attenuation of EM radiation. The results have showed that the absorption mechanism mechanism over the measured frequency range. The PVDF composite can be used for industrial EMI shielding applications.

Introduction
 Conducting polymer composites (CPC) consisting of insulating polymer matrix and conductive fillers have attracted the scientific community as an alternative to traditional metal based EMI shielding material. The CPCs offer excellent protection along with desirable features like, light weight, low cost, flexibility, easy processing, corrosion resistance. The carbon-based conducting fillers like carbon nanotube (CNT) and carbon nanofiber (CNF), graphene, carbon black are effectively using as a conductive fillers to establish EMI shielding composite structure. Increase of their high aspect ratio, superior mechanical properties, tunable electrical conductivity. PVDF is a semi-crystalline fluorine-polymer is selected as the host polymer matrix due to its excellent properties like good thermal stability, flexibility, chemical stability, mechanical strength, higher dielectric constant. These properties make it an ideal matrix for EMI shielding properties. Ni-MWCNT and GCNF were used as conducting fillers and their effect on EMI shielding properties on the host polymer matrix is investigated and discussed.

Materials and Methods
 *PVDF grade Kevlar 301 F, density 1.77 g/cm³, melting temperature 155°C, 140°C.
 *Fillers - Ni-MWCNT with mean outer diameter of 10-20 nm, length of 10-30 μm, and GCNF of diameter ~200 nm, length of 10-30 μm. The required amount of Ni-MWCNT and GCNF were added into PVDF using Hake mixer. The operating speed was 60 rpm with 200°C for 10 min. Then the resulting mixtures were subsequently compression molded at 220°C, in order to obtain a composite sheet and are identified as P, PNi, PNiS, PNiGS and PNiGS.

Results and Discussion

Composite	σ_{DC} (Ω ⁻¹ cm ⁻¹)	Attenuation Constant (dB)
P	9.93×10^{11}	339
PNi	9.58×10^{11}	3562
PNiS	1.53×10^{12}	2408
PNiGS	5.61×10^{11}	2072
PNiGS	2.94×10^{12}	3148

Equations:
 $SE_{dB} = SE_{R} + SE_{A} + SE_{T}$
 $SE_{R} = 20 \log_{10} \left(\frac{Z_0}{Z_0 + Z_c} \right) = -8.68 \log_{10} \left(\frac{1 + \sqrt{1 + \frac{4Z_0^2 \sigma_{DC}}{\rho d}}}{2} \right) = -8.68 \text{ dB}$

Conclusions
 The electromagnetic shielding efficiencies of the PVDF composites are very significant and a SE_T in the range of 10 to 30 dB is obtainable, depending upon the Ni-MWCNT and GCNF filler content and the frequency of interest.
 As compared to other composites, the composite PNiGS has the highest shielding efficiency, lowest skin depth and higher attenuation constant.
 The EM absorption is observed to be dominant attenuation mechanism in PVDF composites.
 SEM analysis has shown that the distribution of MWCNT and GCNF fillers leads to significant changes in the surface morphology and the microstructure of the PVDF composites.
 The DC conductivity is observed to increase with the addition of Ni-MWCNT and GCNF fillers due to the formation of conducting network within the insulating PVDF matrix.

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References

Faculty Achievements Contd

Hearty Congratulations to Prof. Kanchana S K & Dr. Shivraj Watage



Dr. Shivraj Watage

Prof. Kanchana S K

Published a paper in an international conference with topic *Studies on Polyvinyl alcohol(PVA) based copper oxide (PVA/Cuo) nanocomposite films.*

Registration number: ICAMMC 2021 - 665

Studies on polyvinyl alcohol (PVA) based copper oxide (PVA/CuO) nanocomposite films

S K Kanchana, * N. Vanitha, S and Shivraj Madvilappa, PhD
Department of Basic Science Engineering and Humanities, Atria Institute of Technology, Bangalore, India

Abstract

In the present work, Polyvinylalcohol (PVA) and PVA based copper oxide (CuO) films were synthesized by solution cast technique to understand the modifications in structural and optical properties of polymer nanocomposite films [1]. The total of 4 films were prepared including both pure PVA film and CuO film. The films were prepared in three different concentrations of 0.1, 0.2 and 0.4 wt%. The pure PVA and PVA/CuO nanocomposite thin films were studied for their structural and optical properties. Structural characteristics were carried out by FTIR which reveals the presence of CuO nanoparticles into the PVA matrix. Different modes of absorption bands were identified by FTIR and Raman Spectroscopy. Optical parameters like Direct, indirect band gap and activation energy were calculated by UV-Vis Spectroscopy [2].

Methods and Materials

Materials: Polyvinyl alcohol (PVA) and Copper Oxide(CuO) powder was purchased from Thomas Baker, India.
Experimental method: PVA film was dissolved in 100ml of Distilled water at 50 °C and stirred continuously with magnetic stirrer to obtain clear homogeneous solution for about 1 hour. This solution was then poured in petri dish and dried at 70 °C for about 8 hrs and free standing film was obtained.
PVA/CuO nanocomposite films were synthesized by adding different wt% 0.1, 0.2 and 0.4 of CuO into the homogeneous PVA solution resulting different composition films.
The thickness of the free standing films (PVA/CuO) were measured by digital Microscope and the average film thickness. The obtained free standing films were cut into 2x3x0.3mm and these films were carried out for different characterization.
Instrumentation: The structural studies of PVA/CuO composite films were carried out using XRD - Rigaku - SmartLab and FTIR (3700-650cm⁻¹) analysis.

Conclusions

- The effects of different composition of CuO nanoparticles on structural properties were observed.
- The intensity of PVA-CuO nanocomposite film peak increases with increase in nanofiller wt%.
- The intensity of PVA peak decreases with increase in nano filler wt% of CuO.
- Different vibrational bands, functional groups were identified by FTIR analysis.
- The vibrational bands of PVA are slightly shifted by the addition of CuO nanofiller.

Introduction

Polyvinyl alcohol (PVA) polymer exhibits high dielectric strength, charge storage capacity, electrical, optical properties, thermal stability and mechanical strength. PVA can easily form charge transfer complexes with metal oxides through its hydroxyl group, which facilitates good interactions between the polymer matrix and nanoparticles [1]. PVA is also used in the biomedical field due to its biocompatible, non-toxic, and biodegradable nature. Copper oxide (CuO) is a low cost nanomaterial and is one of the potential p-type semiconductor that gains attention due to its excellent optical, electrical, physical, and magnetic properties. CuO with nanoscale band gap of 1.2 eV is extensively used in many technological fields such as gas sensor, thermal conducting materials, magnetic recording media with very good sensitivity, solar cell application.

Results

XRD patterns of pure PVA and PVA-CuO nanocomposites having 0.1, 0.2 and 0.4 wt% of CuO respectively are shown in Fig. 1. PVA film showed a peak at 2θ=19.14° corresponding to (1 0 1) crystal plane which indicates the semi-crystalline nature of PVA. The intensity of PVA film peak decreased with increase of CuO wt% because of interaction takes place between PVA matrix and CuO nanofiller. XRD patterns of the nanocomposite films showed no shifting of peak at 2θ = 19.14° but showed new sharp peaks at 2θ values of 32.52, 32.76, 38.72, 48.83, 53.70, 58.65, 64.86, 66.52 and 68.88 for the CuO which clearly confirms the presence of CuO nanoparticles into the PVA matrix. The intensity of PVA-CuO composite film peak increases with increase in nanofiller(CuO) wt%.

Discussion

FTIR analysis was performed to understand possible interaction between PVA-CuO nanocomposite films as shown in Fig. 2. A strong broad absorption band at 3270-3285 cm⁻¹ is identified as O-H stretching vibration of PVA. The band corresponding to C-H asymmetric stretching vibration occurred at 2923-2942 cm⁻¹. A peak at 1717-1742 cm⁻¹ corresponds to C=O stretching vibration. A peak at 1320-1380 cm⁻¹ is due to C-H bending of CH₂ in PVA. A band at 1243-1226 cm⁻¹ corresponds to -CH₂ wagging. Another strong band observed at 818-833 cm⁻¹ and identified as -CO₂ stretching mode. A band at 3094-1000 cm⁻¹ is attributed to C-O-C stretching of acetyl group present in PVA matrix. There was no appearance of additional peak in IR spectra, a considerable shift in the peak position of the band corresponding to C-H stretch and C-O-C stretch vibrations, indicated as physical interaction between hydroxyl groups of PVA and CuO.

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Hearty Congratulations to Prof. Vanitha S & Dr. Shivraj Watage



Dr. Shivraj Watage

Prof. Vanitha S

Published a paper in an international conference on the topic *Structural and Optical properties of PVA Polymer/inorganic (PVA/ZnO) nanocomposite films.*

Registration number: ICAMMC 2021 - 508

Structural and Optical properties of PVA polymer/inorganic (PVA/ZnO) nanocomposite films

N.Vanitha, S K. Kanchana, S, Shivraj madvilappa, PhD
Department of Basic Science Engineering and Humanities, Atria Institute of Technology, Bangalore, India

Abstract

In this work, pure PVA and PVA-ZnO thin films were synthesized by solution casting method with different concentrations of ZnO (0.1, 0.2, 0.3, 0.4 wt%) into PVA polymer matrix. Addition of ZnO into the PVA matrix, the transparency of thin films were decreased [1]. Changes in the structural properties of prepared thin films were characterized by X-ray Diffraction (XRD), which indicates the presence of ZnO structure in the films. Optical parameters of thin films were studied by Ultraviolet Visible (UV-Vis) Spectroscopy and Fourier Transform Infrared (FTIR) Spectroscopy [2]. Fourier transform infrared spectra showed the characteristic peaks, which corresponds to O-H and Zn-O bonds present in the thin films [3]. The Raman spectra of PVA/ZnO nanocomposite films were reported.

Methods and Materials

Materials: Polyvinyl alcohol and Zinc Oxide AR grade were purchased from Thomas Baker and 5 of fine chem limited, India respectively.
Method: Pure PVA and PVA-ZnO nanocomposite films were synthesized by solution cast technique. 2g of PVA was dissolved in 100 ml of double distilled water and stirred at 50 °C for about one hour and the obtained homogeneous solution was poured on petri dish. The solution was allowed to dry at 70 °C for 8 hours then free standing films were obtained.
ZnO nanoparticles of different weight percentage namely, 0.1, 0.2, 0.3 and 0.4 wt% were added to the homogeneous solution of pure PVA and stirred for about one hour at 50 °C. The solution was poured on petri dish and allowed to dry for 8h at 70 °C. PVA/ZnO nanocomposite films were prepared.
The film thickness was measured by digital Scrape gauge and the average film thickness was found to be 0.23 mm. The films were cut into 2x3x0.3 mm dimensions for various characterization.
Instrumentation: The structural properties of PVA, ZnO nanocomposite films were carried out using XRD - Rigaku - SmartLab and FTIR (3700-650cm⁻¹) analysis.

Conclusions

- Pure PVA and PVA/ZnO nanocomposite films were synthesized by solution cast method.
- The intensity of PVA peak decreases with increase of ZnO wt%.
- XRD patterns showed the presence of ZnO structure in the PVA/ZnO nanocomposite films.
- Different vibrational bands and functional groups were identified by FTIR analysis.

Introduction

Poly - Vinyl Alcohol is a Semi Crystalline white Coloured synthetic polymer. It is a linear polymer of ethylene and calcium in water [4] with a chemical formula (C₂H₄O)_n. PVA is reinforced with nanofillers such as ZnO, CuO, MgO, etc... The physical and chemical properties of pure PVA thin films are changed based on the addition of nanofillers.
Inorganic polymer composite materials have a prominent application in opto electronics devices. In the present work, Zinc oxide (ZnO) is used as a nanofiller. ZnO is a low cost and eco friendly semiconductor. ZnO has transparent good electrical conductivity, wide bandgap and high surface to volume ratio hence it is widely used in optoelectronics and various electronic devices such as solar cell, light emitting diodes, sensors etc[5].

Results

XRD patterns of pure PVA and PVA-ZnO nanocomposites having 0.1, 0.2, 0.3 and 0.4 wt% of ZnO respectively are shown in Fig. 1. PVA film showed a peak at 2θ=19.14° which indicates semi crystalline nature of PVA. The intensity of PVA peak decreases with increase of ZnO wt% because of interaction takes place between ZnO nanoparticles and PVA matrix.
PVA/ZnO nanocomposite films showed some additional peaks in comparison with pure PVA. This confirms the formation of PVA/ZnO nano composite films. The obtained peak values were found to be in good agreement with the values found in the literature values (JCPDS No. 36-4513). The intensity of PVA/ZnO nanocomposite film peak increased with increase of ZnO wt%. This indicates the presence of ZnO nanoparticles into the PVA matrix.

Discussion

FTIR analysis was performed to understand possible interaction between PVA-ZnO nanocomposite films. FTIR analysis has been carried out in the spectral range of 4000 to 500 cm⁻¹ as shown in Fig. 2. A strong broad absorption band between 3273 and 3305 cm⁻¹ corresponds to O-H stretching vibrations of PVA. Band at 2920 to 2922 cm⁻¹ is identified as C-H asymmetric stretching vibrations. A peak at 1718 - 1732 cm⁻¹ corresponds to C=O stretching vibration. A band at 1395 to 1398 cm⁻¹ corresponds to C-O-C stretching of acetyl group present in PVA. Band peak at 848 to 854 cm⁻¹ is identified as -CH₂ stretching mode. The wave number corresponds to 1252 to 834 cm⁻¹ indicates the presence of ZnO stretching [7].

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Faculty Achievements Contd

Hearty Congratulations to Dr. Sravan Kumar T



Dr. Sravan Kumar

Congratulations sir for publishing the paper

1. On Partial Differential Equations on Applied Mathematics, Study of mixed convective –radioactive fluid flow in a channel with temperature-dependent thermal conductivity.
2. On the topic Heat transfer, Numerical study of moving fin with thermal properties.

Partial Differential Equations in Applied Mathematics 5 (2022) 100144

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Study of mixed convective–radiative fluid flow in a channel with temperature-dependent thermal conductivity

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ARTICLE INFO

Keywords: Mixed convection; Heat conduction; SAE; Variable viscosity; Variable thermal conductivity

ABSTRACT

In this paper, the heat transfer equation is coupled to Navier–Stokes equations for a steady vertical channel. The objective of the present study is to investigate the thermally convective process that will be affected and interaction with variable properties. The combined effects of temperature dependent thermal conductivity and temperature dependent viscosity are considered. The analysis is presented in dimensionless form and the resulting equations are solved both numerically (Galerkin method) and analytically by fourth order Runge–Kutta with shooting technique. The dimensionless parameters that influence the temperature field and the velocity field are variable thermal conductivity parameter ($\lambda = 1, 2, 3, 4, 5$), variable viscosity parameter ($\mu = 1, 2, 3, 4, 5$), optical density field parameter ($\delta = 1, 2, 3, 4, 5$), Hartmann number ($1 \leq M \leq 10$), buoyancy parameter ($\beta \leq 1, 2, 3, 4, 5$) and wall temperature ratio parameter ($\gamma = 1, 2, 3, 4, 5$).

1. Introduction

In the present era of multidisciplinary research, study of heat transfer process under various engineering and science disciplines shows greater scope for researchers to contribute more. An example is the fluid mechanics field demonstrating heat transfer through convection more intricately. The applications of heat transfer are vast in the field of engineering where study is conducted on flow devices and systems factors. The same study can be conducted in the case of human system to evaluate heat transfer in the body. As researchers have been engineering their ideas to upgrade the methodologies to improve heat transfer, devices invented using nano fluids have greater impact in the industry research. In the same context, investigation on nano particles is performed using mathematical homogeneous model to study the flow systems present while describing by Rajan et al. and Bhattacharya et al. A review is presented critically considering nano fluids for active convective heat. It is demonstrated that nano fluids with higher values reduce the stability of nano particles and the results for various cases are compared and analyzed by Rajan et al. The similar study is done by considering flow between oil and water over fibers and results are depicted numerically and graphically. It is observed that the boundary layer thickness and velocity near it decreases with increasing Reynolds number by Cheng et al. In heat transfer play a vital role in the case of solar energy, the convection process gains attention due to nano fluids application and with technology implementation. A deeper discussion is presented using progressive methods and other methodologies to solve the stability issues by Mishra et al. Testing is done for heat produced at holding number in the case of nano- refrigerant for flat channels using experimental methods by Ghoshal et al. A similar study is done using Lattice Boltzmann software presenting heat transfer applications in advanced context by Singh et al. Further a comprehensive review on nano fluids for heat transfer is done for studying various properties under different practical cases by Bhattacharya et al. Also new techniques to reduce heat transfer in single phase is studied and categorized for heat exchanger applications by Alan and Kim. An investigation on nano fluids in hybrid form is conducted through various experimental methods to study various properties and characteristics related to heat transfer by Hammad and Hirasat. The study of the flows with the mechanisms of heat transfer and magnetohydrodynamics play a vital role in many fields of science and engineering. The mathematical and physical concepts related to magnetic field dynamics in the case of electrically conducting fluids have been of greater importance in the fields of engineering and industries. In MHD, the physical effects due to the fluid motion along with the application of magnetic field externally. A study of nano fluids in various cases of heat exchangers have gained interest, application of external magnetic in the study also has equal and superior importance. Many investigations have been conducted by considering fluid flow and MHD. An investigation on nanofluids with effects of entropy and radiation combined with MHD is done. The defined nonlinear equation

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HEAT TRANSFER

ORIGINAL ARTICLE

Numerical study of moving fin with thermal properties

Tharavada Sravan Kumar Pobbathu Aswathanarayana Dinesh, Suresh Babu Ramakrishna, Avula Sreevalkha Reddy

First published: 09 May 2022 | <https://doi.org/10.1002/htj.22562>

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Abstract

In the present study, the influence of numerical analysis involves the transfer of heat for moving fin under convection and radiation with fluid properties depending on internal heat generation is considered. The temperature field for the fin is derived based on the defined geometry. This is transformed into a linear model as per the boundary conditions. The dimensionless analysis is performed, and the equations obtained are solved by Runge–Kutta Fehlberg fourth-order method coupled with the shooting method. The effects of the relative parameters are studied and depicted graphically. Finally, the computational observation indicates that there is an enhancement of temperature variation under the influence of thermal conductivity gradient, heat generation, and

Hearty Congratulations to Dr. A. VijayaBhaskar Reddy



Dr. Vijaya Bhaskar

Congratulations sir for publishing the paper with Atria Affiliation On European Journal of Medicinal Chemistry Reports on the topic Recent Advances on Anticancer activity of coumarin derivatives.

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Recent advances on anticancer activity of coumarin derivatives

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ARTICLE INFO

Keywords: Anticancer activity; Biological applications; Coumarin analogues; Molecular docking; SAR

ABSTRACT

Coumarin derivatives are important class of natural plant metabolites that offers variety of biological activities. They can also be derived synthetically, and a wide variety of synthetic coumarin derivatives (azoles, sulfonyl, furan, pyrazole etc) have shown promising anticancer, antitumor and anti-proliferative activities. Coumarin derivatives are not only effective anticancer agents, but also possess minimum side effects. On the basis of different substitution patterns, these potentials have displayed tremendous capability to regulate the potential anticancer activities. In view of the above, efforts have been made by the scientists to develop the scaffolds that possess minimal side effects. This review article covers the recent developments of coumarin derivatives that are biologically active against various cancer cell lines. Further, it also highlights the evaluation of these active candidates via *in vivo*, *in vitro*, MTT assay. The ongoing developments in the discovery of novel anti-cancer agents and their effectiveness using Structure Activity Relationship is also discussed in detail.

1. Introduction

derivatives occur in the roots (*Ferulago campestris*), leaves (*Murraya paniculata*), fruits (*Aegle marmelos*) and seeds (tonka beans) of plants [5]. These scaffolds play an intriguing role in the cancer treatments. The

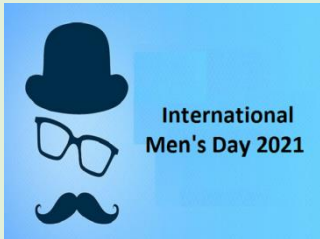
Bridge Course Classes

The department of Basic Sciences Engineering and Humanities had conducted the Bridge Course classes for the 1 year students of the academic year 2021-22. The main aim of this bridge course was to help students get a strong foundation on the basics of engineering and to revisit the concepts which they have studied in their pre-university classes.

In this regard, students were trained in three areas namely Mathematics, Communicative English and Python. The first batch of Bridge Course commenced from October 11th 2021 to the 3rd of November 2021 and 170 students were enrolled for the course. They were further divided into two sections namely B1 and B2. The sessions were handled for a period of 45 hours, with each subject being handled for 15 hours. The second batch of bridge course was held between the 23rd of November 2021 till the 4th of December 2021. This batch had nearly 50 students and the sessions were handled for 30 hours with 10 hours for each subject. The third batch started 20th Dec 2021. This batch were with 60 students.

The course commenced with the pretest where the previous knowledge of the students were tested. This helped the teachers to design suitable strategies to engage the students in the class. This was followed by the classes and the course completed with the Bridge Course Test. Students received their results through mail.

Students actively attended the classes and claimed that it helped them to have a good command over the basic concepts of engineering, which would further be helpful in their semester classes.



National Men's Day
November 19th 2021

Department of Basic sciences Engineering and Humanities had celebrated National Men's Day on 19th Nov-2021. All the men faculties actively participated in all the games

NATIONAL MATHEMATICS DAY CELEBRATION



The department of Basic Sciences Engineering and Humanities had celebrated National Mathematics Day on the 22nd of December 2021 to commemorate the birth anniversary and the contribution of the eminent Indian mathematician Srinivasa Ramanujan. The day was witnessed by organizing several events related to Mathematics for the first-year students.

A poster was circulated throughout the department and students were asked to register for the events in which they participated, through a google form. There were nearly 280 students who registered for the events. The list of events were Quiz, Poster making, Slogan writing, Essay writing, Just do It, Best out of Waste, Collage. The winners of the events were declared and would be awarded during the celebration of National Science Day.

Event Name: Slogan Writing

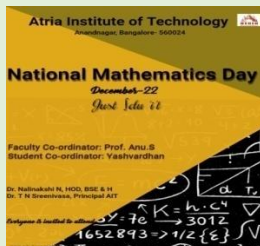
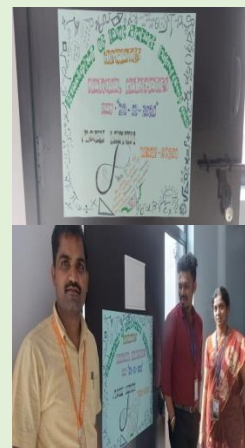
Date: 22 December 2021

Event Co-Ordinator: Prof. Nagendra Naik

On the occasion of National Mathematics Day, the Department of Basic Science had organized a slogan writing competition for the first-year students. Nearly 20 students had registered for the event. Students were asked to write a slogan on the theme “**Rule Of Math “If it seems, you’re doing it wrong”**” and the time given was 20 mins. Students enthusiastically participated in the competition and came out with creative slogans, expressing their views on the role of Mathematics.

The slogans were judged by Prof. Kanchana S K and Prof. Chethan, who further exclaimed that students had put in a lot of thought processes in developing the slogan. The winners of the events are as follows

1. Gopika A – EC- H Sec
2. Preksha Y L- CSE- B Sec
3. Shaik Afreen- CSD- G Sec



Event: Just Do it

Date: 22 December 2021

Event Co-Ordinator: Prof. Anu.S

Student Co-Ordinator: Yashvardhan M

“National Mathematics Day” is celebrated on December 22 to honor great Mathematician “Srinivasa Ramanujan”. The day marks the birth anniversary and in 2012 by Prime minister Manmohansingh declared as the National Mathematics Day. Department of Basic Science & Engineering organized a set of events amongst the students to get interest about Mathematics. The Competition was an individual event and held in two slots namely Concentration game and Question series round. There were 30+ students out of which 15 selected for next level. The event held from 4:00 PM to 6:00 PM and the students were very energetic and actively participated and made an event with great success.

Winners of the event

1. Syed Masood Hussain-G Sec
2. Keerthana S- G Sec
3. Pruthvi S – I Sec



Event: Quiz

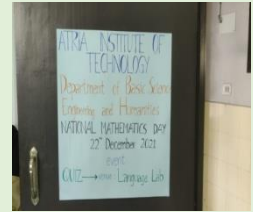
Date: 22 December 2021

Event Co-Ordinator: Prof. Mahesh

On the occasion of National Mathematics Day, a quiz competition was conducted for the first-year students, to help them understand the role of Mathematics in their day to day life. There were nearly 80 participants who were divided into teams of two who participated in the quiz. The quiz was held with the help of google form which consisted of 50 questions. Students were tested on various levels such as basic general knowledge, aptitude, mathematical and logical reasoning. Students actively participated in the quiz and the winners of the quiz are as follows:

Winners of the event

1. SayedaHusnain H Sec
2. Alisha Khalid- G Sec
3. G Rajasjekar Reddy- I Sec



Event: Best out of Waste

Date: 22 December 2021

Event Coordinator: Prof. Ramya N

Participants of this competition created extraordinary pieces of art by using waste materials such as cardboards, bottles, plastic materials etc. Their ideas were well crafted and most of the art work could indeed solve day to day problems. The judges Prof. Srinidhi S U and Prof. Vanitha N appreciated the participants and asked them to take up their project to the next level and work on the same so that they would offer something promising to the next generation.

Winners of the event:

1. VenkatSirisha&Ritika R from ISE
2. Pruthvi S &Nisha P N



Event: Collage

Date: 22 December 2021

Event Co-Ordinator: Prof. Yoga Lakshmi & Prof. Pavithra K

Collage was a team event with 2 participants held in CC302 with theme 'Math Around Us' The participants of this event displayed mass of images through a collage by depicting the relevance of science in current scenario. Participants elucidated their craft to the judges namely Dr ShivarajWatage, Professor, Dept. of Physics &Ashwini B T, Professor, Dept. of Civil Engineering

1. Chaithra M N (H Section)
2. Prashitha& P V Varshini (A Section)
3. SreenVargese&Sameeksha (A Section)



26th Jan 2022

Republic Day

Republic day is celebrated on our Atria institute of Technology on 26th Jan 2022. The principal hoisted the national flag on the college campus at 9:30 am followed by National anthem. And the chief guest of the program Mr. Mohan kulkarni gave a speech on National festival, Culture and about the situation of that year.

Principal Mr. T N Sreenivasa also told us about the ideals of the greatest people and significance of the historic day also inspired us to become good citizens of the country. Few students presented solo dance performances on the day.



21st Feb- 2022 Matrubhasha Divas

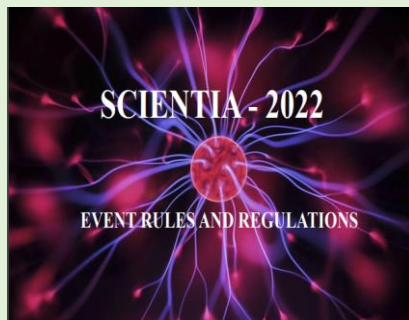
Atria Institute of Technology, Department of Basic sciences Engineering & Humanities celebrated Matrubhashadiwas on 21st Feb 2022 to promote various mother tongue and culture of the nation.

As a part of the celebration, It was organized essay writing and elocution about different Languages.

The dignitaries Principal T N Sreenivasa, BSE HOD Dr. Nalinakshi N, ECE HOD Dr. Arun Balodi, IQAC Head Vasanthi, Placement Head, Civil HOD Dr. Surendra H J addressed the gathering and also told the importance of different Languages and cultures. The celebration were to promote multilingualism and awareness of cultural and linguistic diversity. It was also added that the languages are the most powerful tools.

NATIONAL SCIENCE WEEK – SCIENTIA -2022

The Department of Basic Science Engineering and Humanities organized the first edition of National Science Week celebration SCIENTIA – 2022, 21st February to 26th of February 2022. The events were conducted between 3:00 – 5:00 pm in the department classrooms. Each event was organized with the help of a faculty and student and they were judged by first year teachers and coordinator.





Event: BEST OUT OF WASTE

Date: 22.02.2022

Event Coordinator: Prof. Ramya N & Prof NagendraNaik K

On the occasion of "SCIENTIA 2022"Day, the Department of Basic Science had organized a Best out of waste competition for the first-year students. Nearly 30 students had registered for the event. Students were making best out of waste the time given was 90 mins. Students enthusiastically participated in the competition and came out with creative minds, expressing their views on the Best out of waste.

The Best out of waste were judged by Prof. Sreevaishnavi P and Prof. Chethan C S, who further exclaimed that students had put in a lot of thought processes in developing the event. The winners of the events are as follows:

Poojitha 3rdSem ECE, SamreenTaj from D Sec & Sapna Naik from J Sec.



Event: LOGO DESIGNING

Date: 24.02.2022

Event Coordinator: Prof. Pavithra K & Prof. Anu. S

On the occasion of "SCIENTIA 2022"Day, the Department of Basic Science had organized a Logo Designing competition for the first-year students. Nearly 40+ students had registered for the event. The modern age of technology has taken students to a stage where they have a smooth hands on experience in the art of creation. With technology, participants of this event had to develop a logo and the results were overwhelming. Students had put on the hat of creative and came up with interesting logos and had explained the logic they have employed in their logo to the judges namely Dr. Venkatesh and Dr. Nidhi



Event: POSTER MAKING

Date: 25.02.2022

Event Coordinator: Dr. Yogalakshmi S & Prof. Indira S

The Department of Basic science had organized Poster making competition. This competition focused on participants creating a poster on the theme. Participants involved themselves actively in this contest by designing beautiful posters which were both handmade and digital.

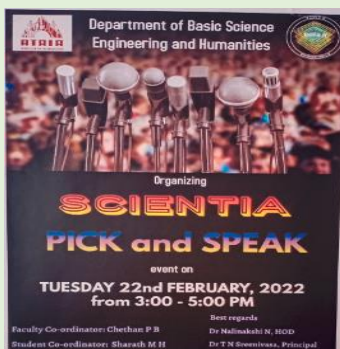


Event: CREATING MATHEMATICAL MODELS OF APPLIED SCIENCE

Date: 23.02.2022

Event Coordinator: Dr. Sravan kumara T & Prof. Mahesh K S

The Department of Basic science had organized a competition on Creating Models by using applied Science. Students were actively participated in the event and made a huge success.



Event: PICK & SPEAK

Date: 22.02.2022

Event Coordinator: Prof. Chethan P B & Prof. VenkateswarluDasari

Pick and speak is the spotlight for those who voluntarily hold the mike and speak up to the topic and look up to the curious crowd. The stage was set and it was time for the speakers to highlight their perspectives on the picked topic and impress the audience. One by one, each having their points with timer set tried their best and indeed a few did steal the audience's heart and were rewarded with a huge round of applause.

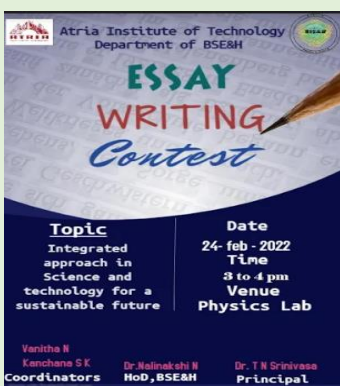


Event: DEBATE

Date: 23.02.2022

Event Coordinator: Prof. Kanchana S K & Prof. VenkateswarluDasari

The competitors of this event displayed their argumentative skills based on various science related topics. This competition was a heated one where the opponents fought to justify their take on the topic, and it seemed to be a healthy competition. The participants claimed that the event was a hit and had requested the coordinator to hold such competitions in the future too. The judges for the event were very happy for the debate competition.



Event: ESSAY WRITING

Date: 24.02.2022

Event Coordinator: Prof. Vanitha N & Prof. Kanchana S K

Atria institute of technology had organized an essay writing competition on 24th Feb 2022 between 4:00 pm & 5.00 pm. The theme of the essay writing competition was given on spot. Students participated in the competition and wrote an essay writing based on the theme given. The program was conducted through offline mode. Many no of students participated and made a huge success.



Event: COLLAGE

Date: 24.02.2022

Event Coordinator: Dr. Shivaraj Watage & Prof. Vanitha N

The participants of this event displayed an amass of images through a collage by depicting therelevance of science in current scenario. Participants elucidated their craft to the judges Prof. Pavithra K & Prof. Anjan Kumar D.

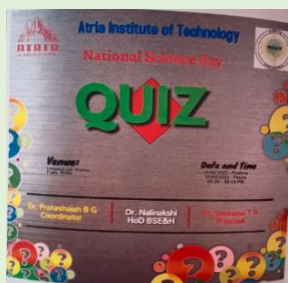


Event: PROJECT EXHIBITION

Date: 26.02.2022

Event Coordinator: Prof.Venkateswarlu Dasari& Team

This was a mega event of the week and the projects developed by the participants were filled with creativity. There were nearly 25 teams testing their hands on projects related to the field of Chemistry, Physics and to real life situations. Students had developed mini working samples such as air purifier, steam engine, traffic signal, biometrics for hotel check in, mobile regulated switches etc. Most of the models were cost free and if worked on they could be an asset to the society. The judges of this events was Dr. Ramesh Kupuswamy & Prof Vasanthi and all the heads of all the departments were addressed.



Event: QUIZ

Date: 21.02.2022 & 21.02.2022

Event Coordinator: Dr. Prakashaiah

This event was the most spotted one. The competition was held in two slots namely Quiz Prelims which took place first and qualifiers moved to Quiz Finals which was held on the 21/2/2022. This was a team event and out of which 5 teams were selected for the finals. The finale was a blockbuster with students actively tossing their brains to hit on the right answers



Event: DUMB CHARADES

Date: 21.02.2022

Event Coordinator: Prof. Sreevaishnavi

On the occasion of Scientia, Basic Science Department had organized Dumb charades team event. The traditional way of playing dumb charades is either with movie or actors names. But the team creatively planned and conducted it with the names from social, economic and political areas. Many number of participants were registered and Students enjoyed this event.



Event: INNOVATIVE DRAWING

Date: 22.02.2022

Event Coordinator: Dr. Venkatesh

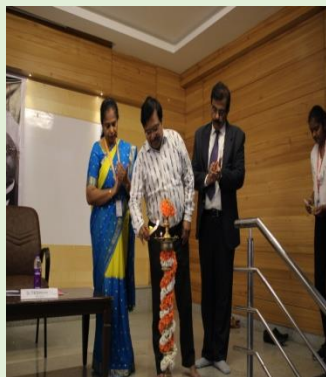
Innovative Drawing competition was held. The theme for the said competition was given on spot. As many as students participated in the competition enthusiastically depicting colourful paintings. The judges of the event were Prof.Ramya N & Prof. Anu S.



National Science Day

March 4th 2022

National science week celebrated and all the prize winners were awarded on Grand National Science day celebrated on March 4th. Dr. TalabathulaSrinivasa from IISC was the chief guest of the day and gave a motivation speech about the science. Students from basic science department were received trophies and certificateds for all the events held in scientia week. The day is celebrated to encourage youth to understand the aspects of science and develop an interest in it. The goal is to explain the importance of science among people. The day was a grand success.



26th Feb 2022

Counseling sessions – Radhika conducted for 3 weeks

Students counseling is an important regular activity in the college which is aimed at encouraging and nurturing students to excel in academics and to help them for their overall development. This activity provides support and guidance for academic.

Purpose of Counseling

- To understand students learning an ability in academics.
- To help the student work out a plan for solving their difficulties.
- To help the student know their interests, abilities and available opportunities.
- To encourage special talents and develop the right

While interacting with the students during the counseling session, their grievances are collected; suggestions are provided by the counselor regarding their grievances. All these details are uploaded in EERP for that particular student who is being counseled, also maintaining a written document



March 8th 2022

Women's Day Celebration:

A grand Celebration was organized to mark the international women's Day on 8th of March in the college. The event was conducted under the guidance of Principal sir. Guest were called who achieved in various departments and gave a motivational talk. Women employee were the part of the program and honored the women staff who were working from two decades



March 19th 2022
Parents Teachers Meeting

Parents Teacher Meeting was held on 19th March 2022 for 1 year BE Students from BSE Department to discuss the performance and progress of students with their parents.

It started with Dr. Nalinakshi delivered the activities conducted by the department followed by principal T N Sreenivasa inspiring talk and then about Placement in Seminar hall and then It was also discussed both strengths and areas of improvements with the class coordinators.

Parents were given feedback on their ward's performance in first and second internals. Also parents Suggestions were noted



22nd March 2022

Worlds Water Day

Department of BSE and Civil coordinated and celebrated World's water Day on 22nd March 2022.

It was discussed about the importance of water in our lives and also discussed about the scarcity of water in the world. The aim of the program was to aware about the water crisis around the world.

*Respected Guest **Dr. K C Subhash Chandra & Mr. Prakash Koliwad** delivered a valuable speeches on the topic **"No Matter, how rich you are, you cant live without water"**.*



Cordial Welcome to The New Tutors of The Department



Prof. P Vaishnavi S

Prof. P SreeVaishnavi holds a Master's Degree in Chemistry in regional institute of Education, Mysore. With a passion towards teaching, she began her career as a teacher and has been guiding several students for competitive examination. She started her journey with BSE, AIT on 1st April 2021. We welcome Prof. SreeVaishnavi to BSE, AIT to train our engineering students.

Prof. Bhavya B S

Prof. Bhavys B S Obtained a MA English from _____. With a passion towards teaching, she began her career as a teacher. Mam being enthusiastic in her undergraduate in conducting off stage programs and also mam has qualified National Eligibility Test(NET) for Lectures/ Assistant Professorship.. She started her journey with BSE, AIT on 15th Dec 2021. We welcome Prof. Bhavya B S to BSE, AIT.



Dr. Sravan Kumar T

Dr. Sravan Kumar T has completed Phd in Applied Mathematics(Fluid Dynamics) in VIT University. He has 6 years of experience and had worked in various Reva University & Sri venkatesaperumal College of Engineering and Technology and also teaching cum research assistant in VIT University. Sir has presented papers in national and international conferences. Sir is very passionate towards Research and was reviewer and coauthor also. Sir is been awarded for Annual Research for the year 2016 by VIT University. Sir Strated journey with BSE, AIT on Jan 24th 2022. We welcome sir to the team and wish the best and we wish his contribution would strengthen the growth of the department.

Dr. A. VijayaBhaskar Reddy

Dr. A VijayaBhaskar Reddy has completed Phd in Chemistry from Sri venkateshwara University. He Has 11 years of experience and 4 years in Teaching research. Sir is very passionate towards Research, sports and reading books. Sir started journey with BSE, AIT on 18th March 2022. We welcome sir to the team and wish him the best for his new roles.



Editors:

*Dr. Nalinakshi N
Dr. Prakashaiah B G
Mr. Chethan P. B
Ms. Jeslin G
Ms. Anu. S*