FIRST INTERNATIONAL CONFERENCE

On
"Physics @ World Contemporary and Innovative Applications"

Date: 03-05 September 2021

Organized By: Christen Eminent College Academy of Management Professional Education and Research Indore, M.P.

First Edition, 2021

Price: 375 Rs.

Size: A4

978-93-91903-05-3

RFI Publication
International Book Publications

Acknowledgement

I would like to express my sincere gratitude to all the authors, researchers and reviewers, who provided their detail research and views for **(IC-PWCIA-2021).**

I would like to thank my family, who supported and encouraged me in spite of all the time it took me away from them. This conference could see the light of day due to generous support from the WFST.

The readers and beneficiaries vary from academicians, professional engineers and scientists, to undergraduate and graduate students from all over the country.

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RFI/2021/CEC/129

DIFFUSION INDUCED PARAMETRIC INTERACTIONS OF ABSORPTION AND AMPLIFICATION IN QUANTUM SEMICONDUCTOR PLASMAS WITH SDDC

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Abstract: We have presented an analytical investigation of diffusion induced parametric interactions in quantum semiconductors with strain dependent dielectric constant (SDDC) by using the quantum hydrodynamic (QHD) model. The diffusion induced third order (DITO) complex susceptibility and threshold pump due to a nonlinear current density have been determined by the coupled mode theory. It is found that diffusion induced parametric interactions (PIs) shows usual dispersion characteristics of absorption and amplification. The real and imaginary part of DITO susceptibility illustrates variation with pump electric field E_0, wave number k and plasma frequency ω_p, respectively. The qualitative behaviour of real part of DITO susceptibility $\chi^{(3)}_{real}$ found to be in both negative and positive regime but imaginary part of DITO susceptibility $\chi^{(3)}_{imag.}$ Shows only negative regime at specific scale range of parameter.

RFI/2021/CEC/131

CORRELATION OF EFFECTIVE CHARGE WITH SCHULTZ AND RANDIC MOLECULAR TOPOLOGICAL INDICES

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Abstract: Effective charge as a total charge within a certain molecular volume around the nucleus. Some Co (II) complexes were used to establish correlation between effective charge with some topological indices like Schultz and Randic. Many studies have been made where the various physico – chemical properties are correlated with the topological indices because the properties of a molecular system are affected by the topology of molecule. These studies have shown a very good correlation demonstrating the utility of the graph theoretical approach. The result obtained in these studies shows that the topological indices of organic molecule acting as a legend can be used for estimating effective charge theoretically.

RFI/2021/CEC/132

STUDY OF THERMO POLARIZABILITY OF IONS IN LINBO3 OPEN TYPE OPTICAL WAVEGUIDE USING POINT DIPOLE APPROXIMATION

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Abstract: The Thermo Polarizability of ions in $LiNbO_3$ open type optical waveguide is calculated using Point Dipole Approximation. The refractive index of any material is a function of the "Local" field experienced by the constituent ions. We have used the Point Dipole Approximation and Sell Meier equations to evaluate the variations of ordinary refractive index (no), extraordinary refractive index (ne) and the birefringence (dn= ne- no) in LiNbO3 with temperature. These values are used to find the possible set of Electronic Polarizabilities (EP) of Li+, Nb5+ and O2- ions at different temperatures from 298 K to 873 K

for the wave lengths λ = 0.4545µm, 0.6328µm and 1.0642µm. The EP of Li+ ion was assumed to be isotropic and temperature independent, the value of which is 0.029 $\times 10^{-24}$ cm^3. It is observed that as the temperature increases, for a given wavelength, the polarizability of Nb^{5+} ion decreases and that of O^{2-} ion increase. For a given temperature, with increase of wavelength the polarizabilities of both Nb^{5+} and O^{2-} decrease.

Keywords: Polarizability, Thermo–Polarizability, Point Dipole Approximation, Birefringence, LiNbO$_3$.

RFI/2021/CEC/133
STUDY OF REFRACTIVE INDEX PROFILE NEAR THE SURFACE OF YVO4 OPTICAL WAVEGUIDE USING POINT DIPOLE APPROACH

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Abstract: Yttrium Ortho Vanadate (YVO4) is a positive uniaxial, wide transparency range optical fiber material with large birefringence. It has enormous applications in the Photonics Industry. Its electro-acoustic, acousto-optic, nonlinear-optic, piezo-electric, pyro-electric and electro-optic, photo-refractive properties makes it most preferable for photonic, electronic and sensor applications. It is used widely in optical filters, optical modulators, beam deflectors and thin film photonic devices. Variation of refractive indices near the surface of YVO4 optical fibers is observed. The "Local" fields experienced by ions near the surface of fiber material are different from those in the interior. Using theoretical Point Dipole Approximation (PDA), one can calculate refractive index variation near the surface of the material. In thin films and optical waveguides, this variation can alter the propagation characteristics. The variation of ordinary and extraordinary refractive indices (no, ne) from the surface to a depth of 71.2A° near the surface for X-cut and Z-cut YVO4 waveguides are evaluated using PDA. For an X-cut, Z-propagation waveguide, no is found to decrease from 2.353 on the surface to 1.993 in the interior whereas, ne is found to increase from 1.5927 to 2.2154. For a Z-cut waveguide, no is found to increase from 1.444 to 1.993 whereas ne is found to decrease from 2.69 to 2.22. It is observed that the refractive indices no, and ne variation with depth near the surface for both the cases are quite opposite in nature.

Keywords: Refractive Index, YVO4, Point Dipole Approximation, Waveguide and Thin Film.

RFI/2021/CEC/134
X- RAY ABSORPTION FINE STRUCTURE STUDIES OF SOME COPPER (II) DITHIOCARBAMATE COMPLEXES

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Abstract: X-ray absorption is a powerful technique to explore the environment of the absorbing atom in all type of materials. In present work X-ray absorption find structure studies of some copper (II) dithiocarbamate complexes have been done using seifert X-ray generator and couchois type bent crystal X-ray spectrograph of 0.4m radius. It has been shown that the graphical method proposed by Lytle, Sayer and Stern gives information about the bond length. While the phase parameter of the first co-ordination shell $\propto 1$ and $\beta 1$ Provide of the useful information about the forward and back scattering atoms respectively, the total phase shift $\delta 1$ gives an idea about the periodicity of the X-ray absorption fine structure.

RFI/2021/CEC/137
EXAFS DATA ANALYSIS AND DETERMINATION OF BOND LENGTHS

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Abstract: The present paper deals with the comparative study of experimental and theoretical EXAFS data analysis. The X-ray absorption measurements have been performed at the recently developed BL-8 dispersive EXAFS beam line at 2.5 Ge V Indus-2 Synchrotron Source at RRCAT, Indore, India. The data obtained has been processed using EXAFS data analysis program Athena. The Lytle, Sayers and Stern (LSS) method and Fourier Transform method have been used for determination of bond lengths of the studied complexes. The theoretical EXAFS data of the same complexes has been generated and Fourier transformed using MathCAD software. The theoretically calculated bond length has been compared with experimentally obtained bond length using Lytle, Sayers and Stern (LSS) method and Fourier Transform method.
Keywords: EXAFS, Fourier Transform, MathCAD, Athena, Bond length

RFI/2021/CEC/139
EVALUATION OF ENVIRONMENTAL NOISE POLLUTION IN AN ACADEMIC ENVIRONMENT, PORT HARCOURT

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Abstract: Noise is one of the factors that remains a nuisance and has impacts negatively on social, physical and psychological wellbeing. The study reveals that noise is a prominent feature of the environment which including from transport, churches, industry, clubs and neighbors. The exposure of these features disturbs in learning environment and it interferes in a complex task performance, and causes discomfort and annoyance in an academic environment. Thus, the research findings state that noise creates multi-problems to the teaching and learning process that affects the academic performance of the students negatively. The noise level is ranged 52-60 dB (A) and 61-70 Db (B) in and around the academic environment in Port Harcourt. The result shows that the rate of noise level in an academic environment is on a high side and not suitable for teaching and learning process. Therefore, a call for awareness, Acts and legislative regulations should be strictly adopted.
Keywords: Noise, Noise Pollution, Environmental, Academic Environment.

RFI/2021/CEC/140
PRO AUTONOMOUS ESG PO WATER TRIHYBRID CLEAN NANOTECH

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Abstract: As a mission: We have know-how to face the climate change countermeasures with custom double sourcing supply hybrid technologic compact platform to fit the equality of accessibility by all and the continuous regeneration of Mutual Sustainability between Human initiatives and Biomass metabolization. As a business: Our market with no direct competitor represents 5,400 TWh and 16,808 Mm3h plus 524,136.8 metric Tons C*h (C*, carbon captured) to achieve in 16 years.

RFI/2021/CEC/142
CHARACTERISTICS OF AEROSOLE TEST FOR FAST REACTOR

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Abstract: This paper describes characteristics of Aerosole Test for Fast Reactor. Methodology developed in an aerosol test for sampling and analysis of sodium aerosol of a

fast reactor. The methodology involves: sampling of sodium aerosols by drawing them without exposure to the atmosphere. The aerosol size distribution is found to vary from 1 to 12 μm with the Mass Median Diameter (MMD) around 4.0 μm (σ_g = 1.5), and the mass concentration is found to be ~ 9.50g/m³ and the values agree with the values found in the literature.

The reactor design evolved further into generation IV type reactors, which addresses compact core, thermal and fast neutron spectra, and closed and open fuel cycles. The generation IV type reactor systems are very high temperature gas reactor (VHTR).
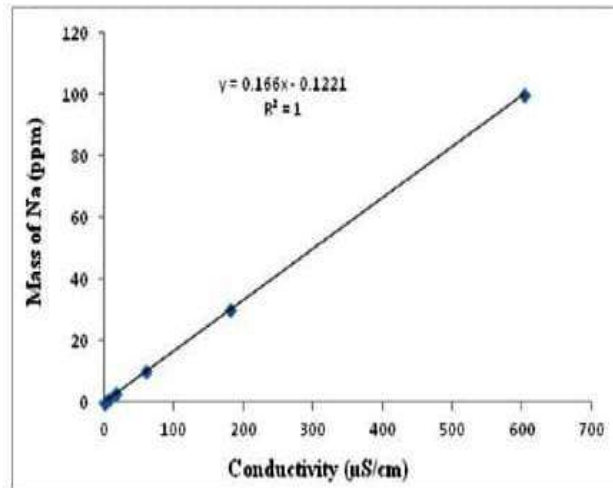
Keywords: Characteristics, Fast Reactor, Reactor Design, Compact Core, Fast Neutron Spectra.

COMMON FIXED POINTS IN BANACH SPACES

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Abstract: In this paper we study on common fixed points in Banach spaces. We assume that E is a Banach space. C is a nonempty closed convex subset of E and $T : C \to C$ is a nonlinear mapping. We use F(T) to denote the set of fixed points of T. Recall that T is nonexpansive if

$$||Tx - Ty|| \leq ||x - y||, \forall x, y \in C. \tag{1}$$

A point $x \in C$ is a invariant of T provided Tx = x. Denote by F(T) the set of non-invariant points of T; that is, $F(T) = \{x \in C : Tx = x\}$.

One classical way to study non expansive mappings is to use contractions to approximate a non expansive mapping. More precisely, take $t \in (0,1)$ and define a contraction $T_t : C \to C$ by

$$T_t\, x = tu + (1-t)T_x,\ x \in C \tag{2}$$

Where $u \in C$ is an invariant point?
We have the following result:
Let K be a bounded closed convex subset of a Hilbert space H and let T be a non expansive mapping on K. Fix $u \in K$ and define $z_t \in K$ as $z_t = tu + (1-t)Tz_t$ for $t \in (0,1), \{z_t\}$ converges strongly to an element of F(T) nearest to u.
Keywords: Nonempty, Closed Convex, Nonlinear, Non expansive, Contractions, Approximate.

RFI/2021/CEC/144
"XANES ANALYSIS OF CU (II) COMPLEXES"

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Abstract: The X-ray absorption spectroscopy is a very strong informative experimental approach to study the coordination geometry and bonding relation in metal compounds. The near edge feature involves the transition from some core state to allowed lowest unoccupied empty states in the valance region of a given atomic center. XANES reveal to identify the allowed transitions and also the mixing or splitting of the final state orbital. [1, 2] Using known structural data, informative deductions on structure-bonding relations have been made. For Cu-containing complexes, Cu K-edge XANES has been widely used to derive information on the electronic and geometrical structure, and some attempts has succeeded in interpreting the absorption features of Cu K-edge XANES spectra In the present study, it has been reported that Cu K-edge XANES analysis are useful for the quantitative estimation of Cu (II) coordination states in copper metal complexes.

RFI/2021/CEC/145
BIOPHYSICS AND TOOTH MOVEMENT- A CRITICAL APPRAISAL

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Abstract: Biophysics is defined as the stream which studies physics in association with living matter. Therefore, is the study of biologic function, structure, and organization in relation to and by the methods of physics? Biophysical considerations help in reducing the trial and error method of designing orthodontic appliances. Models of physics and mathematics have been utilized to great advantage to provide needed information for the mechanics of forces and movements required in orthodontics. The concepts in the area of biophysics have been developed by Graber (1961), Burstone (1962), Haack and Weinstein (1963), and Jarabak and Fizzell (1963). The patterns of forces acting on a tooth are more complex than what is usually comprehended and this act on the dentition during the entire lifespan.

The movement of teeth through alveolar bone is certainly a biological process that occurs when the forces act on the surfaces of the teeth. Forces acting on the teeth can be divided into two categories in a broader sense. One of them includes the natural forces from the oral cavity as a result of normal function, growth and development of the same. Examples of which include force of eruption that acts on each tooth during the stages of its root formation, forces of the tongue, lips and other extra-oral musculature. Also, during the functions of occluding the teeth and mastication of food, the dentition experiences a variety of forces with varying magnitudes and directions that are intermittently being applied. This also includes the forces of gravity and atmospheric pressure acting on the teeth.

RFI/2021/CEC/146
BIOPHYSICS AND DENTISTRY

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Abstract: For many years there has been an interest in the development of new technologies for use in the oral environment. The focus for a number of methods has been directed toward research, although with the ultimate goal is often applicability to the clinical situation. The paradigm shift in dental caries management from restoration to prevention has led to interest in the ability to detect carious change in the tooth at early stage. In addition it is important to be able to monitor the caries process together with the effect of any strategies aimed at preventing the progression of caries in the clinical situation. Diagnosis therefore not only involves the ability to detect the presence of caries

but also to attempt to determine the activity of the lesions that are present. It is against this background that novel applications are existing and also newer biophysical technologies have emerged as aids for diagnosis of dental diseases.

In particular there has been a demand for techniques that allow caries, periodontal diseases, erosion, tooth wear, plaque and calculus to be quantitatively assessed. The development of appropriate techniques offers the research community the opportunity to elucidate in detail not only the disease processes but also the efficacy of agents and therapies to prevent or halt the progression of dental disease.

RFI/2021/CEC/147
"OLFACTORY MARKETING: INNOVATIVE SUBSET OF NEUROMARKETING"

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Abstract: Marketing has metamorphosed from barter system, to production concept, to product concept & so on. It has been evolving in all its forms. From the time we get up in the morning till we go to sleep our sensory functions constantly register in our brain. Humans have five sensory perceptions namely vision, sound, touch, taste & smell using which we enjoy life on earth.

RFI/2021/CEC/149
NANO-HETROSTRUCTURE OF TYPE-II COMPOUND SEMICONDUCTORS SHOWING LASING ACTION IN MID INFRARED REGION

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Abstract: A nano - hetrostructure of W shaped type-II compound semiconductor which have combination of layers made by AlSb, InAs and Ga as Sb is studied for utilization in Lasing action of Mid Infrared Region (MIR). For this hetero structure, a multiband band k.p Hamiltonian has been simplified to compute the required carrier's wave functions, their sub band structures and matrix dipole elements accountable for the probabilistic transitions which results into the high optical gain. For 2-D charge carrier density of 1.5×10^{12} cm^{-2}, the computed results confirm that only the light whole (LH) sub bands take part in optical transition in order to produce the high optical gain of the order of ~8850 /cm which correspond to ~5.2 µm. Keeping in view its high optical gain at ~5.2 µm, the proposed type-II Al Sb/In As/Ga as Sb hetero structure can be of use in the environmental monitoring, particularly important for sensing the CO_2, CO and NO lethal gases available in the contaminated environment.

RFI/2021/CEC/150
X-RAY K-ABSORPTION SPECTRAL STUDIES OF TERNARY COBALT (II) COMPLEXES WITH AMINO ACIDS

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Abstract: X-ray absorption fine structure at the K-edge of [Cobalt(II) (Bipyridine)(L-Tyrosine)M] complexes where X= C l, Br, NO_3, SO_4 ,CH_3COOHhave been recorded at BL-8 Dispersive Extended X-ray Absorption Fine Structure (EXAFS) beam line at the 2.5-GeV INDUS-2 Synchrotron Source, RRCAT, Indore, India. The bond length have been determined using four different methods, i.e., Levy's, Lytle's, Lytle Sayers and Stern's (LSS) and Fourier transformation methods. Both LSS and Fourier transformation methods give phase uncorrected bond lengths and hence results obtained from them have been compared with each other. The data obtained has been processed using EXAFS data analysis program Athena and Origin 6.0 Professional.

ADS/CFT FOR ANALYSIS OF BIG CRUNCH

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Abstract: A biggest challenge for today's astrophysicist is to solve the mystery of primordial evolution of the universe. This is also known as belongs to Planck's era. In this stage space-time singularity and inflationary phase all occur when universe was just of the size 10-5m. All this evolution occurs in a tiny fraction of a second. This description is made by joining the cosmological principle of isotropy and homogeneity, the Hubble law, and the Einstein's field equations of General Relativity in the Big Bang Theory or Standard Cosmological Model (SCM). The SCM is failed to describe first moment in which universe emerges out in presence of singularity. Due to failure of above model quantum theory of gravitation is needed to understand the evolution of early universe. Quantum gravity (QG) is a field of theoretical physics that need to describe gravity by the principles of quantum mechanics, and where quantum effects cannot be ignored, such as in the vicinity of black holes or similar compact astrophysical objects where the effects of gravity are strong(such as neutron stars). Though the theory is able to unfold many mystery but the observational results to prove it are still not exist. The Quantum Cosmology provides some simulating models to understand the primordial evolution by adding some hypothesis. The SCM well explain the observational data with consistency but have some limitations. In present paper Anti de Sitter and Conformal Field Theory are combined together to study condensed matter made up of extra dimensional particles like Dilaton and Strings which are going to decide ultimate fate; the Big Crunch of our Universe. The ADS/CFT correspondence is used to understand the transition from expanding universe to non relativistic transformation to obtain Big Crunch.

THERMAL LOAD ANALYSIS OF REFRIGERATOR WITH DIFFERENT REFRIGERANTS

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Abstract- The domestic refrigerator is one of the most used appliances worldwide and the majority of these refrigerators are based on the vapor compression technology; thus, in literature, several studies have focused on thermal improvements and energy strategies in the system operation. In this study are Calculated the total heat transfer rate inside the domestic refrigerator cabinet, and Calculated the temperature distributions inside the domestic refrigerator cabinet. The main objective of the study calculated air flow inside the refrigerator cabinet. Optimized the overall design of refrigerator increase the cooling effect inside the cabinet.Results of The total air circulation inside the refrigerator domain increase due to rectangular hole shelve. And temperature inside the domain decrease up to 260.5k.
Keywords: Refrigerator, Temperature, ANSYS, CFD.

VEDANTA: THE SCIENCE OF EXTRAMUNDANE

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Introduction - Vedanta recognizes two worlds for human exploration: the external and the internal. A vast inner world of experience waits to be discovered. The external world is what is revealed to us through the five senses. Today, biologists tell us that we still do not know enough about the human body. However, in the Indian tradition, adhyatma- vidya or the science of spirituality proclaims that behind the body-mind complex there is a vast, infinite source of energy, which can unfold and manifest. Religion has another aspect the scientific.

Vedanta associates external and internal knowledge. The Upanishads discovered the five sheaths covering the infinite atman. They said: Study the human system in depth. The human being is essentially divine. This is a great truth, discovered and re-authenticated, and meant to be realised by every human being. You have the capacity to realise your true nature. Behind this tiny ego under the control of the genetic system is an infinite dimension of awareness, the Self.

RFI/2021/CEC/159
STUDY OF LOWER CRITICAL MAGNETIC FIELD OF MERCURY BASED CUPRATE WITHIN THE FERMI LIQUID APPROACH

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Abstract - We study the thermo dynamical parameter describing the superconducting state and their anisotropy of mercury based cuprate system. The two dimensional conducting CuO_2 planes and their numbers in a unit cell are significant and important features for Hg-based cuprates. We have deduced the lower critical magnetic field of Hg- 1201 cuprate superconductor at T_c within the Fermi liquid approach. The result is analysed and discussed with the available experimental data.

RFI/2021/CEC/160
VARIATION IN ENTRY FLOW OF ION SPECIES AT MATERIAL BOUNDARY

Prabhat Kumar Dubey
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Abstract - The conventional sheath and presheath theories are widely discussed in many arenas and it always at the centre to many investigations. The basic features of the plasma-sheath transition have been revealed in the early works of Langmuir in the kinetic analysis of the low pressure column. In these investigations the essence of the Bohm criterion was used in an implicit form. One of the fundamental and well known results is the Bohm criterion.

RFI/2021/CEC/161
BONDING OF H2O GROUPS IN A SALT, FREE AND BOUND WATER & THE GEOMETRY OF WATER IN HYDRATES

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Abstract- An introduction to hydrated salts. Beginning with a brief historical introduction to blue vitroyl, the bonding of water groups in a hydrated salt has been explained here. The various modes of motion of water groups with regard to spectroscopic studies have also been described in this chapter. The importance of thermal deaquation and further of deaquation in electric field have been emphasized.

RFI/2021/CEC/162
EXPERIMENTAL STUDY OF HEAT TRANSFER, WAYS OF MINIMIZING THE CONVECTIVE & RADIATIVE LOSSES OF COOKING POT

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Shashikant Sharma, Guide
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Abstract - "Energy can neither be created nor be destroyed but can be transferred from one form to another" aptly suits the present day scenario of energy crises when no segment of this planet is left untouched to reduce the power consumption which itself is imperative.

Yet, many inventions and discoveries literally blooms to meet the demand and supply energy equation yet nothing pops out to meet the break-even analysis of everlasting demand and supply chain. There are some parts still left behind, that's ought to be explored. Cooking food and its wastage of heat by conduction, convection and radiation is one of the prime example of this.

Cooking, quintessentially is considered as on vital process for the survival of human being on Earth for many reasons such as to reduce the illness that might crept onto us due to the microbial action. Secondly, to give food a texture, to give better taste to eat and so on. In doing all this, enormous amount of heat energy is needed. Simultaneously, a small portion of heat is actually being used up for cooking and a major portion of heat (energy) goes in vain and hence wasted out.

Cooking pots, utensils used for cooking plays a vital role to drastically lowers down the energy consumption by minimalizing the wastage of heat energy. Typically, biogas, L.P.G, electric heater stove, induction cooker etc. are being used to supply the heat energy to heat up the cooking pots and utensils. L.P.G is widely used fuel among all.

The place where we frequently came across the phenomenon of heat loss is generally in cooking. Cooking pots surfaces being in higher temperature than the ambient temperature, provokes the heat loss, also the handle which assists lifting the pan/pot sums up the heat loss if the same is not insulated.

RFI/2021/CEC/163
STUDY OF THE EFFECT OF DIFFERENT OPERATING PARAMETERS ON ADSORPTION AT DIFFERENT RATIOS BY PROPOSED COMPOSITES OF MULTIWALLED CARBON NANOTUBES

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Abstract- In these research abortion element carbon nanotubes has prepared by chemically vapor deposition method by utilizing ethylene which is a source of carbon and for this as catalyst Nano crystalline iron has used. Composites of the Nano crystalline iron and MW carbon nanotubes process has mention at article. The preparing of Composites of MW carbon nanotubes was conducted in a high temperature furnace at 800°C. After that the absorbent sample has prepare at normal room temperature under normal atmosphere. Modification in Surface of Composites of carbon nanotubes has performed through oxidation. For 24 hours of continuous agitation of 10 gram sample has taken for oxidized in solution of HNO3 at 30°C. After that deionized water is at neutral pH the use to wash Composites carbon nanotubes. A fine polycarbonate membrane is use to filtered composite. Adsorption tests were done in a carafe flask, where the dye arrangement with 300 mL amount with beginning dye fixation has put. Beginning convergences of dye shifted from 5, 15, and 25 mg/lit. The trials take exclusively for MW carbon nanotubes and Composites of carbon nanotubes abortion capacity. The flagon flask with dye arrangement has fixed and set in a temperature-controlled vibrating water container (specifically use for this experiment) and unsettled at a steady speed of 200 rpm. To watch the impact of temperature the examinations were completed at three unique temperatures, i.e., 15° , 25o and 35 °C.

Before blending in with the adsorbent, different pH levels of the dye arrangement were balanced at 7.5. At the point when the ideal temperature was reached, around 30 mg of adsorbent was included into the carafe. At foreordained minutes, 1 ml of watery example was taken from the arrangement, and the fluid was isolated from the adsorbent by centrifugation at 6000 rpm for 8 min. The convergence of BR46 in arrangement was resolved Spectrophotometry. The adsorbed dye quantity at time t can be measured by At (mg/g).
Keywords: Multi-Walled Carbon nanotube, Methyl blue dyes, Orange-red dyes, Thermodynamic parameters, Carbon nanotube abortion.