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Scientific Tracks & Abstracts

35 YEARS OF EXCELLENCE IN MEDICAL PUBLISHING

Metal Oxide and Graphene Based Future Nanofluids for Effective Energy Transportation

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Metal oxide and Graphene-based nanofluids were prepared using the ultra-sonochemical technique and 2 step nanofluid preparation method. The heat convection characteristics of as-prepared nanofluids were observed for a closed single conduit (circular, square, Tand annular) in turbulent flow regimes. The prepared nanofluids were characterized for UV-vis, FTIR, XRD, FESEM, and TEM analysis to confirm the accurate synthesis of Metal oxides and Graphene nanoparticles. Analytical data related to heat transfer properties of the synthesized nanofluids for the heat exchanger, incorporated with the conduit test section were collected. The addition of metal oxides and Graphene solid nanoparticles in the water, water@Ethylene glycol, and Ethylene Glycol enhanced the value of thermal conductivity and other thermos physical characteristics of the prepared nanofluids. Supreme thermal conductivity was recorded at a higher value of temperature for used 0.1 wt.% of Metal oxides and Graphene-based nanofluids. Adding the more wt.% of the Metal oxides and Graphene solid nanoparticles in the distilled water, Distilled water@Ethylene Glycol and Ethylene Glycol had increased the thermal conductivity subsequently with variations in temperature from 20 to 45ºC.

Furthermore, Nusselt numbers of Metal oxides and Graphene-based nanofluids were calculated at different wt.% of solid nanoparticles present in varying base fluids. The occurrence of solid nanoparticles into the base fluid intensify the Nusselt (Nu) number by 51.5%, 43.79%, 38%and 24.06% for 0.1 wt.%, 0.075 wt.%, 0.05 wt.% and 0.025wt.% concentrations, respectively. Varying wt.% of ZnO (0.1 wt.%, 0.075 wt.%, 0.05wt.%). The absolute average heat transfer of Metal oxide and Graphene-based nanofluids using at the highest concentration of 0.1 wt.% was enhanced compared to the base fluid. The magnitude of absolute average heat transfer was increased from 600 W/m2k for the EG@DW mixture to 1292 W/m2k for Zinc Oxide @ Glycol-based nanofluids. Correspondingly, the heat transfer development at the other three (0.075 wt.%, 0.05 wt.%, and 0.025 wt.%) was observed as 600–1167, 600–1010, and 600–970 W/m2k, respectively, which is superior to pure Ethylene Glycol base fluid.

Biography

Waqar Ahmed has done his Ph D. degree in Material Physics from the University of Malaya world QS ranking 65. As a Ph D. researcher at the Institute for advanced studies at the University of Malaya, he has led his research activities to synthesize the metal oxides, graphene, carbon nanotubes, and their binary and ternary composite for energy-related varying applications like (energy storage, sensors, energy transportation, Heat, and Mass Transfer, Heating and cooling of electrical and electronic systems, which helps in solidified of his interest in the area of materials and nanofluids. These experiences have reinforced his research interest in material that inspired a career in synthesis and applications of nanomaterials..

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Optimal addition of Zn nanoparticles in High Temperature Superconductors YBCO leads to reduced corrosion resistance

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Substitutional studies of nonmagnetic zinc (Zn) nanoparticles in the superconductor compound of yttrium barium copper oxide (YBa2Cu3-xZnxO7-δ) have been carried out on polycrystalline samples to determine the effect of adding zinc (Zn) nanoparticles on the stability of the unit cell structure in the presence of water. The results show that zinc (Zn) doped samples are found to degrade faster than undoped crystalline chemical compounds of yttrium barium copper oxide (YBa2Cu3O7-δ) in water and the extent of degradation increases with zinc (Zn) concentration. The results also show that there is a direct correlation between the structural instability caused by zinc (Zn) substitution at the copper Cu(2) site in copper oxide (CuO2) planes and its corrosion resistance in presence of water.

Biography

Seema Vats is an Associate professor of Physics at Motilal Nehru College, University of Delhi. Her research interests are in the field of High Temperature Superconductivity and Energy harvesting from non-conventional techniques. She has won the 'Certificate of Appreciation' for the display of the innovation project titled "Generation of Electricity using Eco-economical Non-Conventional Techniques' funded by the University of Delhi. She has several articles published in international and other reputed journals. She has been a Resource Person for Curriculum development and drafting Learning outcomes for students at higher secondary school level. She has won 1st prize for 'Best Innovation Poster' in the 2nd International Conference on Entrepreneurship, Innovation and Leadership(ICEL-2018). She is presently a President of the Indian Association of Physics Teachers, Delhi and Haryana(IAPT RC-01) which is a national level voluntary organization of Physics teachers having more than 8000 life members from India and abroad.

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Principle of Geoexchanger Systems for Buildings Heating and Cooling

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Geothermal heat pumps (GSHPs), or direct expansion (DX) ground source heat pumps, are a highly efficient renewable energy technology, which uses the earth, groundwater, or surface water as a heat source when operating in heating mode or as a heat sink when operating in a cooling mode. It is receiving increasing interest because of its potential to reduce primary energy consumption and thus reduce emissions of greenhouse gases (GHGs). The main concept of this technology is that it utilizes the lower temperature of the ground (approximately <32°C), which remains relatively stable throughout the year, to provide space heating, cooling, and domestic hot water inside the building area. The main goal of this study is to stimulate the uptake of the GSHPs. Recent attempts to stimulate alternative energy sources for heating and cooling of buildings have emphasized the utilization of ambient energy from the ground source and other renewable energy sources. The purpose of this study, however, is to examine the means of reduction of energy consumption in buildings, identify GSHPs as an environmentally friendly technology able to provide efficient utilization of energy in the buildings sector, promote using GSHPs applications as an optimum means of heating and cooling, and to present typical applications and recent advances of the DX GSHPs. The study highlighted the potential energy saving that could be achieved through the use of ground energy sources. It also focuses on the optimization and improvement of the operation conditions of the heat cycle and the performance of the DX GSHP. It is concluded that the direct expansion of the GSHP, combined with the ground heat exchanger in foundation piles and the seasonal thermal energy storage from solar thermal collectors, is extendable to more comprehensive applications.

Biography

Abdeen Mustafa Omer is an Associate Researcher at Energy Research Institute (ERI). He obtained both his Ph D degree in the Built Environment and Master of Philosophy degree in Renewable Energy Technologies from the University of Nottingham. He is a qualified Mechanical Engineer with a proven track record within the water industry and renewable energy technologies. He has been graduated from the University of El Menoufia, Egypt, BSc in Mechanical Engineering. His previous experience involved being a member of the research team at the National Council for Research/Energy Research Institute in Sudan and working as director of research and development for National Water Equipment Manufacturing Co. Ltd., Sudan. He has been listed in the book WHO'S WHO in the World 2005, 2006, 2007, and 2010. He has published over 300 papers in peer-reviewed journals, 200 review articles, 15 books, and 150 chapters in books.

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Artificial Intelligence - Introduction to the Neural Networks

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Artificial Intelligence is an applied science. The idea arose when the number of data to manage and analyze grew exponentially. At the same, the necessity for a quick answer to decision processes grew up. Artificial Intelligence is based on the well-known algorithm of neural networks. The combination of different neural networks often one included in a larger one is considered to be deep learning. In order to make the seminar self-contained, we will start from the very beginning by explaining the concept of neurons, input-output layer, learning algorithms, cost function, synaptic weights. The stochastic nature of the learning algorithms will be shown and some properties of the convergence of the algorithm will be explained with particular reference to the Monte-Carlo algorithm and Simulated Annealing, The concept of the capacity of a neural network will be explained. Artificial Intelligence neural networks have more complex applications including the recent one on tokamaks physics and controlled nuclear fusion. This last issue is very important because of the energetic problem which became central in the last times.

Biography

Brunello Tirozzi is a professor in the Department of Physics, University of Rome. His research interests are Elementary Particle Physics, Statistical Mechanics, Dynamical Systems, Disordered Systems Renormalization Group, Neural Networks, Neurobiology, Asymptotic methods, fluid dynamics, typhoons, tsunami, Plasma Physics. He has published over 200 research papers and participated in various International Conferences.

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MWCNTs Based nanocomposites for hydrocarbons and MB removal from water

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With the rise in the global population, demand for energy resources has been increased. The transportation of fossil fuels especially petroleum oil is a big challenge. The need to reduce the shipping time for petroleum oil causes oil spills which is a major contributor to seawater pollution. A cheap, effective, and environmentally friendly method needed to be adopted for cleansing the seawater. In recent research work, polymers base magnetite multi-walled carbon nanotube(Fe/MWCNTs) are applied for the adsorption of kerosene and toluene from water. Oxidized MWCNTs were incorporated with magnetite and Fe/MWCNTs were prepared. A Physio-sonication method was used for the preparation of final nanocomposites. Two polymers; polyethylene (PE) and poly-N-isopropyl acrylamide-co-butyl acrylate (P-NIPAM) were added to Fe/MWCNTs and final nanocomposite, PE: Fe/MWCNTs, and P-NIPAM: Fe/MWCNTs were obtained. The oxidized and modified MWCNTs were characterized using X-Ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), energy dispersive X-Ray (EDX), fourier transform infrared (FTIR), and (BET). The adsorption experiment for these polymers gave excellent results; PE: Fe/MWCNTs and P-NIPAM: Fe/MWCNTs achieved 3400 mg/g and more than 8000 mg/g removal capacity of kerosene from water, respectively. The polymer PS: Fe/MWCNTs achieved 760 mg/g removal capacity of toluene from water. The results proved that adding polymers to MWCNTs increased their efficiency for kerosene/toluene removal from seawater. For comparison, other metal oxides base nanocomposites like V2O5/MWCNTs and CeO2/MWCNTs were applied for kerosene removal from water and exhibited promising results for oil removal from water.

Biography

Thamer Adnan Abdullah completed his Master of Chemical Engineering from Guru Gobined Singh Indraprastha University, New Delhi. In 2008, he was working as an assistant lecturer at the University of Technology, Baghdad, in the Applied Science Department, Chemistry Branch Group. Currently, he is doing his Ph D. and he is a researcher in the Sustainability Solutions Research Lab, Faculty of Engineering, University of Pannonia, Veszprem, Hungary. He has several articles published in ScienceDirect reputed journals and has participated in many international conferences in the field of environmental chemistry and nano-research.

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Synthesis of inorganic nanomaterials by Unconventional bioelectrochemical systems and their applications

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Statement of the Problem: The biological synthesis of inorganic nanomaterials has been investigated for decades. The nanomaterials produced by biological routs were contaminated with biological origins such as exopolysaccharides, proteins, and cells, thereby limiting their applications in nanomaterial sciences due to their impurity. Recently the bioelectrochemical system (BES) has become a promising tool for recycling the energy from wastewater to generate electricity or for the recovery of metals in nanoparticle forms. The conventional BESs include two chambers (anode and cathode) separating from each other by an ion exchange membrane and an external closed circuit. The cost of the ion exchange membrane is one of the factors hindering the application of BES. The low electric current generation by BES urged researchers to find other applications of the BES such as biosensors. In this study, the unconventional BES of which the design included two separated chambers connected by an electrode rod (charcoal) (namely, non-external circuit bioelectrochemical system (nec_ BES)) was applied for the synthesis of inorganic nanoparticles (CdS, Cu, and Se) and their properties were characterized.

Methodology & Theoretical Orientation: The BES configuration included two bottle chambers separated by silicon membrane but directly connected by a charcoal electrode perforating through a silicon membrane. The electron released from Shewanella spp. at the anode was transferred to the cathode via the electrode, and the proton remained at the anode was balanced with the buffer N-(2-hydroxyethyl) piperazine-N0-2-ethane sulfonic acid (HEPES). The metal ions or thiosulfate anion in the cathode were reduced or precipitated in the form of nanoparticles. The produced nanoparticles were then characterized by scanning electron microscopy (sem), transmission electron microscopy (TEM), X-ray diffraction (XRD), UV-VIS, and antimicrobial activities.

Findings: The Shewanella-inoculating nec_BES successfully generated electron current to the cathode and produced CdS, Cu2Cl3(0H), and Se nanoparticles. The electron current was not possible to detect but the change of pH and lactate concentration confirmed the electron production in the anode. The different structures of inorganic nanomaterials were reported such as the quantum size of Ag and Se, the hollow spherical shape of CdS, and rough crystals of Cu2Cl3(OH). The crystal of Cu2Cl3(OH) demonstrated antimicrobial activities against bacterial plant pathogens.

Conclusion & Significance: The new design of BES is a cost-effective tool for the synthesis of inorganic nanomaterials. The products were clean and ready for further application in material science as well as plant pathogen controls.

Biography

Cuong Tu Ho has expertise in the microbial synthesis of inorganic nanomaterials. His study has focused on the synthesis of nanomaterials by the metal-reducing bacteria (*Shewanella spp*) and their application since 2010. In addition, he was also interested in the interdisciplinary route (chemical, sonochemical, biological, and physical) for synthesizing and crystallizing inorganic nanomaterials.

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Advancements of Artificial Intelligence Using Deep Learning algorithms

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The Future Trends of Artificial Intelligence in Neural networks is developed by Deep Learning algorithms. This paper will show how they can be applied to two important projects. One is to show how it is possible to use Artificial Intelligence (AI) for developing Hi-Tech agriculture. The project consists in developing a hydroponic greenhouse that consumes the minimum of water for the plants using particular concentrations of foods and planning an optimal distribution of water and food in time. The other project is about controlled fusion a central question for developing green energy without using radioactivity materials. The recent results at Jet are encouraging because the high-temperature plasma for fusion has been obtained for a significant time. This is the condition for developing an energy plant. The result has been obtained using AI and a particular deep learning algorithm, reinforced algorithm.

Biography

Brunello Tirozzi is a professor in the Department of Physics, University of Rome. His research interests are Elementary Particle Physics, Statistical Mechanics, Dynamical Systems, Disordered Systems Renormalization Group, Neural Networks, Neurobiology, Asymptotic methods, fluid dynamics, typhoons, tsunami, Plasma Physics. He has published over 200 research papers and participated in various International Conferences..

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