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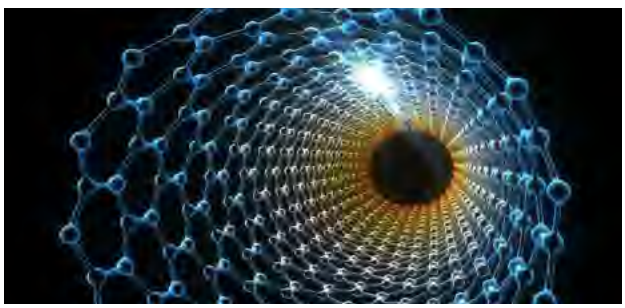
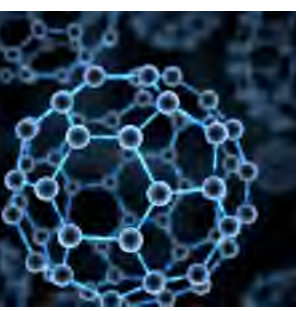
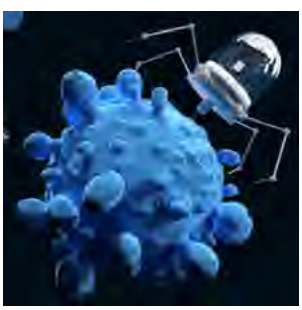
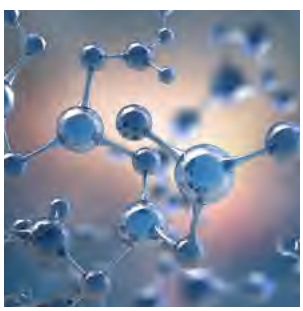

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Plant materials mediated microwave synthesis of iron oxide nanoparticles

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Microwave-assisted hydrothermal synthesis is a method that has been showing increasing interest among scientists, mainly because of its simplicity, reduction in synthesis time, and, most importantly, the ability to control synthesis conditions. Manipulating with synthesis conditions, for example by adding different substances such as natural plant materials, it is possible to control the size, shape, and composition of the final product. Implementation of various plant materials in the synthesis process has attracted much attention due to their environmentally friendly and non-pathogenic nature of product obtaining and thus represents the latest trend in the development of green synthesis techniques.

The hydrothermal microwave method was used for the synthesis of iron oxide nanoparticles in highly alkaline media with the addition of plant material from Dalmatian herbs. Product characterization was performed by Fourier Transform Infrared Spectroscopy (FTIR) and Powder X-ray Diffraction (PXRD), followed by Rietveld analysis to determine the composition and crystallography of the particles. To obtain information on the morphological characteristics of the product, such as the size and shape of the particles, a Field Emission Scanning Electron Microscope (FE-SEM) was used.

Recent Publications

1. Paut, A.; Prkić, A.; Mitar, I.; Guć, L.; Marciuš, M.; Vrankić, M.; Krehula, S.; Tomaško, L.(2022) The New Ion-Selective Electrodes Developed for Ferric Cations Determination, Modified with Synthesized Al and Fe–Based Nanoparticles. Sensors, 22, 297.
2. Mitar, I.; Guć, L.; Soldin, Ž.; Vrankić, M.; Paut, A.; Prkić, A.; Krehula, S.(2021) Rapid Microwave Method for Synthesis of Iron Oxide Particles under Specific Conditions. Crystals, 11, 383
3. Paut, A.; Prkić, A.; Mitar, I.; Bošković, P.; Jozić, D.; Jakić, M.; Vukušić, T. (2021) Potentiometric Response of Solid-State Sensors Based on Ferric Phosphate for Iron(III) Determination. Sensors, 21, 1612.
4. Ristić, M., Kuzmann, E., Homonnay, Z. et al.(2020), Hydrolysis of Fe(III) in the presence of mixed anions and promoters. J Radioanal Nucl Chem 324, 1293–1302 .
5. Radić, J.; Bralić, M.; Kolar, M.; Genorio, B.; Prkić, A.; Mitar, I.(2020) Development of the New Fluoride Ion-Selective Electrode Modified with FexOy Nanoparticles. Molecules, 25, 5213.

Biography

Ivana Mitar received her Ph.D. in Chemistry from the Faculty of Chemical Engineering and Technology, University of Zagreb, Croatia. She is an Assistant Professor at the Faculty of Science, University of Split, Croatia. She is an expert in structural, spectroscopic, and microscopic analysis (FT-IR, Mossbauer, UV-Vis-NIR, EDX spectroscopy, FE-SEM). Her scientific field of work is analytical chemistry, and her scientific interests are chemical synthesis, material characterization, and heat treatment.

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Adsorptive property of Ag, Au and MoS_2 Nanoparticles

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The rapid growth of the population and the demand for hygienic food causes foodborne contaminants worldwide. There are certain nations still failing to supply essential clean and nutrient-rich foods due to economic and political reasons; resulting in many food contaminations. It is well accepted that the presence of contaminants in the food is responsible for many foodborne illnesses, this occurs due to poor food processing practices and usage of many fertilizers during the cultivation. In recent days there is well advanced and highly precise instrumentation available to identify the species responsible for foodborne contaminants. However, it is not affordable for all people. In the majority of cases, the peoples from underdeveloped nations still suffer to identify foodborne contaminants which are mainly heavy metals. The adsorption of toxic heavy metals is important and one of the challenges facing the global world. The metal ion poses an acute health risk to human beings and aquatic animals because of its toxicity both at lower and higher doses. The adsorption of heavy metal on the surface of solids seems to be an effective and efficient method for heavy metal removal, adsorption process is a physiochemical process that requires the use of solids, liquid, and gas as an adsorbent for the removal of heavy metal. Activated carbon sounds to be an effective and efficient adsorbent, however, the regeneration and recovery rate is low. This research focus on the synthesis of nanoparticles based on Ag, Au, and MoS2 as the metal precursor as an adsorbent for the removal of cadmium and lead from the aqueous solution which is considered to be environmentally safe. Cadmium and lead are structural elements that exist as metals or dissolved metal salts. However, the rapid, inexpensive adsorbent reported in this work will be the best alternative method to heavy metal removal.

Recent Publications

1. Sikirat Kehinde Sheu, et. al,(2022) Molecular modelling and structure-activity relationship of a natural derivative of o-hydroxybenzoate as a potent inhibitor of dual NSP3 and NSP12 of SARS-CoV-2: in silico study, J Biomol Struct Dyn, Jan 17;1-19.

Biography

Sikirat Kehinde Sheu is a Ph.D. graduate of the University of York, United Kingdom. She has completed her Master's degree at the University of Ilorin, Kwara State Nigeria. She has participated in various conferences and conventions.

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Electrical transport phenomenon and variable range hopping conduction in reduced graphene oxide/polystyrene composites

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In this work, we investigate the temperature dependence of the electrical conductivity of reduced graphene oxide (RGO)/ polystyrene (PS) composites. We re-analyzed, in our investigation, the experimental measurements of RGO/PS composites with different RGO concentrations obtained by W. Park et al. We show using two different methods: the Zabrodskii method and a numerical method based on the calculation of the percentage deviation; that the electrical conductivity follows, in the beginning, the Efros-Shklovskii Variable Range Hopping regime (ES VRH) with T1/2. This behavior showed that long-range electron-electron interaction reduces the Density Of State of carriers (DOS) at the Fermi level and creates the Coulomb gap (CG). When the RGO concentration increases, we noticed that the temperature dependence of the electrical conductivity tends toward T1/3, which may suggest a possible crossover from the ES VRH regime to the Mott VRH regime for high RGO concentration values. We also, calculated and represented the Density Of State (DOS) per energy and per area function gðEÞ for each sample. We noted that the width of parameter D representing the half of CG width decreases by increasing the RGO concentration and the function gðEÞ tends toward the constant g0 corresponding to the Mott VRH

Recent Publications

1. el Oujdi, Abdellatif & Ennajih, Driss & El Kaaouachi, Abdelhamid & Mounir, El Hassan & Echchelh, Adil & Dlimi, Said. (2021). Positive magnetoconductivity and inelastic scattering time at low temperatures with magnetic field in InSb semiconductor. Molecular Crystals and Liquid Crystals. 1-9.
2. Ennajih, Driss & El Kaaouachi, Abdelhamid & Echchelh, Adil & el Oujdi, Abdellatif & Mounir, El Hassan & Ait Hammou, Brahim & Dlimi, Said. (2021). Study of electrical conductivity in metallic n-type InP semiconductor at low temperature in presence of the strong magnetic field. Molecular Crystals and Liquid Crystals. 1-9.

Biography

El Hassan Mounir is a Ph.D. graduate of the Université Ibn Tofaila Laboratory of Energetic Engineering and Materials, Faculty of Sciences in Ibn Tofail, Kenitra, Morocco. He has contributed many innovative prototypes in his research interest of graphene conductivity. He also participated in many conferences and conventions.

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Investigation of the anticorrosive activity in aggressive environment of new Schiff bases based on Imidazo[1,2-a]pyridine

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University Mohamed I, Morocco

In this work, we report a study on the synthesis and characterization of a new series of Schiff bases based on imidazo[1,2-a]pyridine (IMP) scaffold, and the evaluation of their ability to inhibit the corrosion of mild steel in 1M HCl. Several techniques were employed such as mass loss techniques, Potentiodynamic polarization, and electrochemical impedance spectroscopy (EIS). The obtained results showed that these inhibitors, namely (E)-N-(2-phenylimidazo[1,2-a]pyridin-3-yl)-1-(1H-pyrrol-2-yl)methanimine(IMP1),(E)-N-(2-phenylimidazo[1,2-a]pyridin-3-yl)-1-(thiophen-2-yl)methanimine (IMP2) and (E)-1-(5-nitrothiophen-2-yl)-N-(2-phenylimidazo[1,2-a]pyridin-3-yl)methanimine (IMP3), acted only by reducing the cathode area without changing the mechanism of the cathodic reaction. Also, the effectiveness of the inhibition increases with increasing concentration of the inhibitors. The adsorption of the studied compounds on the surface of mild steel follows the Langmuir isotherm model. Finally, we highlighted the existence of a correlation between the molecular structure of the tested inhibitors and their anticorrosion activity.

Recent Publications

1. Aatiaoui, Abdelmalik & Daoudi, Walid & badri, Asmaa & Salhi, Amin & El Massaoudi, Mohamed & Boutaybi, Ali & Guo, Lei & Loutou, Mohamed. (2022). Anticorrosive potential of essential oil extracted from the leaves of Calamintha plant for mild steel in 1 M HCl medium. Journal of Adhesion Science and Technology. 1-24.
2. Aatiaoui, Abdelmalik & Daoudi, Walid & el Boutaybi, Ali & Guo, Lei & Benchat, Nour-Eddine & Aouinti, Abdelouahad & Adyl, Oussaid & Loutou, Mohamed. (2022). Synthesis and anticorrosive activity of two new imidazo[1, 2-a]pyridine Schiff bases. Journal of Molecular Liquids. 350. 118458
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Biography

Walid Daoudi is a Ph.D. Graduate from the University of Mohamed I, Morocco. His research interest includes nanoscience, nanochemistry, and nanotechnology. He has participated in various international conferences and published many articles.

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Magnetron sputtered tungsten di-sulfide: An efficient battery grade electrode for supercapattery devices

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GIK Institute of Engineering Sciences and Technology, Pakistan

Tungsten disulfide (WS2) due to its layered structure and high capacitance is an attractive electrode material for supercapattery application. In this study, different thickness of WS2 is deposited by the magnetron sputtering technique. The thickness of the sputtered layer is also optimized. The sputtered WS2 is characterized by various techniques such as X-ray diffraction and atomic force microscopy to examine the structural morphology and study the surface morphology. The electrochemical performance of sputtered WS2 is investigated through three-electrode assembly via cyclic voltammetry, galvanostatic charge-discharge, and electrochemical impedance spectroscopy. Sample S2 (WS2 with 250 nm thickness) shows the best performance in comparison with other samples. The S2 exhibits the maximum specific capacity of 346 C/g at 0.5 A/g. The hybrid device is designed by keeping S2 as positive and activated carbon as the negative electrode. The device exhibits a maximal specific capacity of 190.2 C/g and after 3000 galvanostatic charge-discharge, cycles it retains 98.6% of its initial capacity. The maximum specific energy of the device is 45.2 Wh/kg which is high enough and an exceptional maximum specific power of 10,200 W/kg. Furthermore, by applying Dunn's model the diffusive and capacitive contributions of the hybrid device are studied. Moreover, b values are calculated by employing power law, the trend of b values confirms the asymmetric nature of supercapattery device. The excellent results of magnetron sputtered WS2 make it a favorable electrode for its application in supercapattery devices.

Biography

Nayyab Amjad graduated from Hazara University, Mansehra with a field of interest in Physics. She is currently expertise in Applied Physics and studying different nanomaterials for hybrid supercapacitors applications at Ghulam Ishaq Khan Institute, Pakistan. She is also interested in perusing her Ph.D. in the area of batteries and supercapacitors. After completion of the program, Nayyab aspires to work as a researcher in the industry

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Synthesis and characterization of new HDL materials and their application in water depollution

Abderrahmane Hiri, Achour Dakhouche
M'sila university, Algeria

Layered Double hydroxides (LDH) belong to the class of inorganic lamellar compounds and have a high anion insertion capacity. The basic structure of LDH compounds is similar to that of a natural hydrotalcite Mg6Al2(OH)16.CO3.4H2O, in this structure magnesium (divalent cation), has been replaced by aluminum (trivalent cation) with a general formula: [(OH)2]x+[An-]x/n.mH2O. In recent years, LDH compounds have received considerable attention; Anion exchange properties have been widely studied. Interest in the magnetic and electrochemical properties of LDH allows heterogeneous catalysis and applications in the treatment of polluted water. LDH compounds have been used as adsorbents or catalysts in the degradation reaction to non-biodegradable products. In this work, ZnCuAl-CO3-type LDH samples were synthesized. The products have been used as catalysts in the degradation of sodium diclofenac with hydrogen peroxide. The LDH samples are obtained by coprecipitation at constant pH with a molar ratio R (R=MII/MIII) equal to 2. The prepared LDH compounds are characterized by XRD, SEM, and FTIR. Certain parameters were tested such as the mass of the catalyst, the volume of H2O2 oxidant, the temperature, and the contact time.

Biography

Abderrahmane Hiri is a Ph.D. graduate in the Department of Environmental Chemistry at the Inorganic chemistry laboratory, M'sila University, Algeria. His research interest is nanochemistry, materials characterization, and applications of water pollution.

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Accepted Abstracts

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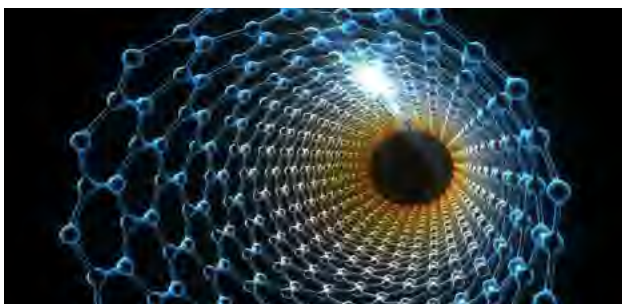
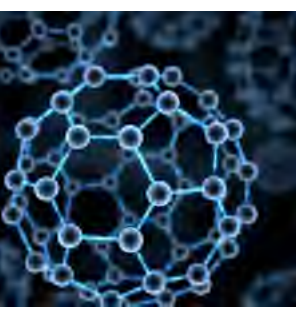
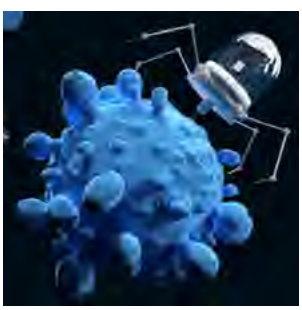
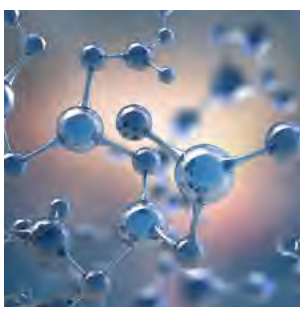

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Structural and optical properties of two-step dip-coated CH3NH3PbI3 films deposited on thin flash-evaporated PbI2 film substrates

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Thin films of methylammonium lead iodide (MAPbI3) were fabricated under various preparation conditions by a dip-coating method, using an underlying layer of lead iodide (PbI2) thin films deposited by flash evaporation on microscopic glass slides. The glass/PbI2 structure was immersed into MAI solution in 2-propanol for different dipping times (10 – 60 min), during which the substrate was slowly rotating. The as-formed dip-coated MAPbI3 films were exposed for 20 to 40 min to thermal annealing at 85 oC. The annealed dip-coated MAPbI3 films were characterized at room temperature by X-ray diffraction (XRD), scanning electron microscopy (SEM), and UV-Vis spectrophotometry. Their as-measured XRD patterns and SEM micrographs revealed a good degree of crystallinity in the tetragonal-phase structure. Their main Bragg's diffraction peaks became intense and narrow with increasing times of the dipping process and/or of the post-deposition thermal annealing at 85 oC; however, prolonged times of dipping of the MAPbI3 films into the MAI in 2-propanol solution had an adverse effect on their final film thicknesses and surface coverage. The as-measured room-temperature transmittance spectra of these MAPbI3 film/glass systems displayed a semi-steep optical absorption edge near 780 nm, corresponding to bandgap energy of 1.55 eV, assigned to the MAPbI3 with an optical absorption coefficient of 105 cm – 1.

Recent Publications:

1. AbuEid, M.A., Jafar, M.M.AG., Hodali, H.A. et al.(2022) Structural and Optical Properties of Two-Step Dip-Coated CH3NH3PbI3 Films Based on Underlying Dip-Coated PbI2 Films. J. Electron. Mater. .

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3. Tashtoush, Nehad & Afafsheiab, Afafsheiab & Momani, Salam & Jafar, Mousa. (2019). Determining Optical Constants of Sol-Gel Vanadium Pentoxide Thin Films using Transmittance and Reflectance Spectra. International Journal of Applied Science and Technology. 9.

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The16S rRNA Characterization of bacteria can degrade monochloropropionic acid in contaminated water

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[2]Baniwalid University, Libya

Organic compounds containing halogens are widely dispersed throughout the world, resulting in pollution. One of the most common xenobiotics used in agricultural activities is monochloroacetic (MCA). Isolated from the Tigers River in Iraq, this strain of bacteria is known as SW2. The standard universal primers Fd1 and rP1 were used with the colony PCR method for bacterial identification before being sent out for sequencing. Basic Local Alignment Search Tool nucleotide sequences and information were analyzed (BLASTn). The phylogenetic tree was constructed using the 16S rRNA sequence to determine their evolutionary distance. The Neighbor-Joining method was used to infer the evolutionary history, and the P-distance method was used to calculate evolutionary distances. The Neighbor-Joining method was used to infer the evolutionary history, and the P-distance method was used to calculate evolutionary distances. There is a 99 percent match between the SW2 bacterium and another type of aerobic Gram-Negative Bacteria. Strain SW2 (Pseudomonas Sp.) was inoculated for two days and yielded colonies that were small, non-spore-forming, and rod-shaped. Growth slowed slightly after 48 hours. A halide ion assay was used to monitor the release of chloride ions as a result of the degradation of MCA. Biochemical tests backed up the choice of the genus's name as well. As a result, bacteria found in the river have been shown to be capable of utilizing and degrading the MCA compound. In conclusion, this study confirmed the presence of bacterial strains isolated that have the potential to utilize MCA, especially from contaminated environments pragmatic application of the bacterial strains to degrade residual herbicide.

Recent Publications:

1. Hassan Muslem, Wafaa & Muslim, Sahira & Ali, Alaa & Fayyad, Raghad. (2022). Detection of Disinfectant property of purified Amylopullulanase from Citrobacter freundii SW. Research Journal of Pharmacy and Technology. 847-852.

2. Hassan Muslem, Wafaa & Edbeib, Mohammed & Huyop, Fahrul & Wahab, Roswanira. (2021). Isolation and identification of bacteria degrading 2, 2-dichloropropionic acid in water.

3. Muslim, Sahira & Mohammed Ali, Alaa & Hassan Muslem, Wafaa & Fayyad, Raghad. (2021). Antimicrobial and Antibiofilm Properties for Chitosan Extracted by Biological Methods Running title: Antimicrobial and Antibiofilm for Chitosan Extract. Annals of the Romanian Society for Cell Biology. 25. 2050-2057.

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Nickel (Ni2+) Substituted Cu0.25Co0.25Mg0.5-xNixCe0.03Fe1.97O4 spinel ferrites synthesized via Sol-gel auto combustion (SGAC) route are the future of business

Muhammad Irfan Arshad
Preston University Islamabad, Pakistan

The sol-gel auto-combustion (SGAC) route was used to prepare the Cu0.25Co0.25Mg0.5-xNixCe0.03Fe1.97O4[Ni-CCMCF] (0.0≤x ≤ 0.5 with the step interval of 0.125) spinel ferrites (SFs). The formation of a single-phase spinel matrix was observed by X-ray diffraction (XRD) analysis. Moreover, the sharp peaks of XRD spectra confirmed the high crystallinity of the as-prepared spinel ferrites. The crystallite size (D) was reduced from (57.33–10.51) ± 0.05 nm and for the pure CCMCF sample, the specific surface area was 20.36m2/g. The variation absorption bands at tetrahedral and octahedral sites along five Raman modes in Raman spectra were also confirmed in the spinel matrix of the Ni-CCMCFsamples. The optical bandgap increased from 0.87 eV to 1.68 eV was observed with the replacement of dopant ions. Furthermore, the minimum resistivity was observed both in Ferro and para regions for the pure CCMCF sample. The tangent loss and dielectric constant were reduced, but conductivity was enhanced with increasing frequency and all the dielectric parameters have a minimum value for the pure CCMCF sample. Therefore, due to the low tangent loss of the pure CCMCF sample that will be used for high resonant frequency applications and electronics, we concluded that these materials are the future of the industry.

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Structural, optoelectronic and thermoelectric properties of Ca-based antiperovskites Ca3BN (B=As, Bi, P and Sb) compounds: Insights from DFT

Hadjer Bendjilali, Chahed Abbes, Rozale Habib
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Recently, alkaline-earth based antiperovskites compounds have been proven to be promising candidate for optoelectronic and thermoelectric applications. In this work a theoretical study structural, electronic, optical and thermoelectric properties of Ca3BN (B=As, Bi, P and Sb) compounds using first-principles calculation with the full-potential linearized augmented plane wave (FP-LAPW) method based on the density functional theory (DFT) as embodied in the Wien2k package. The computed lattice constant was found to be in agreement with the available experimental and theoretical results. Electronic properties shows that the nature of materials is semiconducting with small band gaps (Ca3SbN and Ca3BiN) also semiconducting with large band gaps (~insulating : Ca3AsN and Ca3PN) .Important optical responses of studied antiperovskites are found in the visible and ultraviolet energy range .Finally the thermoelectric properties such as Seebeck coefficient and thermal/chemical coefficients, power factor and figure of merit are calculated .Very interesting results shows that the four antiperovskites compounds could be candidate for thermoelectric devices and alternative energy sources.

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Some Aspects of Green Buildings And Environment

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In the recent attempts to stimulate alternative energy sources for heating and cooling buildings, emphasis has been put on the utilization of ambient energy from ground source heat pump systems (GSHPs) and other renewable energy sources. The exploitation of renewable energy sources and particularly ground heat in buildings can significantly contribute to reducing dependency on fossil fuels. Geothermal heat pumps (GSHPs), or direct expansion (DX) ground source heat pumps, are 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.

Recent Publications:

1. Omer, Abdeen. (2022). Performance, Modelling, Measurement and Simulation of Energy Efficiency for Heat Exchanger, Refrigeration and Air Conditioning. In book: Sustainable Energy Development and Innovation (pp.157-176)

2. Omer, Abdeen. (2021). Analytical Studies of Energy Efficiency Development of the Greenhouses. Journal of Food Technology & Nutrition Sciences. 1-20.

3. Omer, Abdeen. (2021). SUSTAINABLE DEVELOPMENT IN LOW CARBON, CLEANER AND GREENER ENERGIES AND THE ENVIRONMENT. SINERGI. 25. 329.

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