

International Journal of Physics Research and Applications

Volume - 2, Issue - 1

Research Article

Published Date:-2019-12-31 00:00:00

[Synthesis of Carbon Nano Fiber from Organic Waste and Activation of its Surface Area](#)

Carbon Nano fibers (CNFs) have recently attracted a lot of attention due to their widespread range of technological applications attributed to their unique physical and chemical properties, such as, small size, high strength, high adsorption linked with their large specific surface area, high temperature tolerance and corrosion resistance. CNFs have been used in energy conversion and storage, reinforcement of composites and self-sensing devices. The complete removal of entrapped metallic impurities and amorphous carbon incorporated with CNFs has been a long-standing issue. We have developed a new approach for preparing graphitic CNFs and its activation of surface area by purification. This approach entails Thermal Decomposition (TD) based synthesis of CNFs from organic solid waste, such as, stems of rice plants. CNFs are synthesized from organic waste precursor (Rice Stems) at 900 °C under inert atmosphere. The active surface area was measured using a Surface Area Analyzer. Morphology of CNFs was studied with using SEM and XRD. The SEM image shows that the synthesized CNFs have diameter ranging within 45-60 nm.

Research Article

Published Date:-2019-12-04 00:00:00

[Bio-molecular thermal oscillator and constant heat current source](#)

The demand for materials and devices that are capable of controlling heat flux has attracted many interests due to desire to attain new sources of energy and on-chip cooling. Excellent properties of DNA make it as an interesting nanomaterial in future technologies. In this paper, we aim to investigate the thermal flow through two sequence combinations of DNA, e.g, (AT)₄ (CG)₄ (AT)₄ (CG)₄ and (CG)₈ (AT)₈. Two interesting phenomena have been observed respectively. In the first configuration, an oscillatory thermal flux is observed. In this way, an oscillating heat flux from a stationary spatial thermal gradient is provided by varying the gate temperature. In the second configuration, the system behaves as a constant heat current source. The physical mechanism behind each phenomenon is identified. In the first case, it was shown that the transition between thermal positive conductance and negative differential conductance implies oscillatory heat current. In the latter, the discordance between the phonon bands of the two coupled sequences results in constant thermal flow despite of increasing in temperature gradient.

Research Article

Published Date:-2019-11-27 00:00:00

[Biodegradation of gold and platinum implants in rats studied by electron microscopy](#)

Graphical abstract

Biodegradation of implanted gold in human tissue. TEM images reveal markedly biodegradation of implanted gold and re-crystallization of dissolved gold as nanoparticle of different size, shape and crystallinity. Highly crystalline icosahedral Au nanoparticle and the corresponding power spectrum are shown on top.

Background: Despite the importance of biodegradation for the durability of metal prosthesis and the widely use of gold implants, there exist a lack of knowledge regarding the stability of pure gold in tissue.

Methods: We studied biodegradation of grids of pure gold, nickel, and copper as well as middle ear prosthesis of gold, platinum or titanium. Metals were implanted into rat skin and humans. Dissolution and re-crystallization process of the metals was analysed using SEM, TEM, power spectra as well as elemental analysis by EDX and EELS/ESI.

Results: Biodegradation of gold was detected, presumably by solving and re-precipitation of gold around implants. Gold cluster, nanoparticles, and mesostructures were detected, formed by dissolution and re-crystallization process. This process results into a migration of gold into the farer off tissue. Cellular filaments as biomolecular templates facilitate the formation of mesostructures. Loss of function of middle ear prosthesis by biodegradation is caused by chronic inflammation and fibrosis. Indeed, similar processes were detected with platinum, but in a very lower level.

Conclusion: Noble metal implants undergo biodegradation in oxidative environment in tissue. The dissolution – recrystallization process can be explained by enzyme catalysed redox processes comprising reactive oxygen species and reduction agents as ascorbic acid present in cells and body tissue. Enymes like myeloperoxidase inside lysosomes of inflammatory cells produce hypochloride ions and H₂O₂ which can dissolve the gold.

General significance: The crucial role of the specific chemical environments of gold implants in tissue for their chemical stability and durability of function has been demonstrated. Due to widely use and importance of gold implants, this finding is of general interes.

Short Communication

Published Date:-2019-11-27 00:00:00

[Modeling of A.I based Inhalation for Advanced Life Support System Development](#)

Present piece of idea exhibits to divert attention towards automated high precision Life Support System (LSS) instead of manual one using medical intelligence devices while treating and diagnosis to the patient, where Ventilator, inhaler and respiratory control is most important factor during operation, surgeries and in other likewise medical emergency situations to maintain proper saturation in patient lungs to sustain their lives. This work gives idea, how we can design A.I based Inhaler System for the same.

Opinion

Published Date:-2019-11-01 00:00:00

[Biological membranes: The laboratory of fundamental physics](#)

Biological membranes present an essential constituent of living cells. Their main role is to separate the interior of a cell from its surrounding, however allowing the selective transfer of specific material through it. Configuration changes of membranes are often correlated with important biological processes [1-7].

Research Article

Published Date:-2019-07-12 00:00:00

[Nanotechnology to improve the biofouling and corrosion performance of marine paints: from lab experiments to real tests in sea](#)

Nanocontainers of the type CuO, ZnO and CeMo were developed in the present work and incorporated into commercial paints. The nanocontainers were filled with bromosphaerol (CuO and ZnO), SeaNineTM 211 (CuO and ZnO), and 8Hydroxyquinoline (CeMo). The new resulting paints were tested in the lab and in the sea via painting a fraction of two ships. The outcome of this work is encouraging demonstrating that the new nanotechnology-based paints yield to superior commercial paints that may present a major milestone in the new generation of marine paints

Opinion

Published Date:-2019-03-28 00:00:00

[Moving space-matter as the basis of the intelligence in the Physical World](#)

The concept of space-matter motion in the new Cartesian physics, based on the identity of space and matter, creates the basis for the study of consciousness as the action of the brain in space inside and outside itself and offers a way of materialistic explanation of life on Earth. She claims that consciousness in living matter arises when the brain begins to create the surrounding space the image of themselves and the world. And since space according to Descartes is identical to matter, the images created by the brain of itself and the external world in the surrounding space have a material basis and therefore the displayed organs interact with each other and the external world.
