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2nd International Conference on Applied Physics and Engineering(ICAPE)

March 15, 2023 | Paris, France

Scientific Tracks & Abstracts

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Received date: 13-11-2022 | Accepted date: 15-11-2022 | Published date: 23-03-2023

Fabrication and Experimental Verification of Energy Reversible SoI-NEM Switch for Adiabatic Computation and Bio-Medical Applications

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In this work, I present the theoretical analysis and experimental verification of energy reversible Nano Electromechanical Switch (NEMS) for adiabatic computations and bio-medical applications. At its core, adiabatic circuits reduce power consumption significantly during logic operations using a four-phase power clock along with clever circuit arrangements which avoid the build-up of charges across a single transistor. The NEM switches can prove to be the ideal building blocks for these electronics chips as they present no leakage-current and therefore consumes very low static power. In particular, the energy reversible NEM switches can further reduce the power consumption in adiabatic circuits, since these switches conserve and reuse the mechanical bending energy stored in them in the first cycle, and for subsequent switching cycles. In this work, we have reported theoretical analysis and experimental proof of the benefits of using NEM switches (three-terminal and energy reversible, both) in place of traditional Complementary Metal Oxide Semiconductor (CMOS) transistor switches in adiabatic circuits, in terms of the energy dissipation per unit cycle of power clock for various power clock frequencies. Here, we have observed that the experimentally observed reduction in pull-in voltage (13%) for subsequent cycles of switching for energy reversible NEM switches, indicating a reduction in switching energy. It is found that the NEM switches promise to offer lower energy consumption for low-frequency operations (<100 kHz) and therefore it is recommended that it is best suited for biomedical and low-power applications.

Biography

Abdulilah Mayet is an assistant professor at King Khalid University, teaching courses in Nanofabrication and FPGA for AI. He is also the director of the engineering college research center and consultant at the artificial intelligence center (AIC). He has joined King Abdullah University of science and technology (KAUST) and got his master's and doctoral degrees in electrical engineering in the field of microelectronics and doctoral research focused on innovating and fabricating new fully amorphous metal (patented) to fabricate nanoscale MEMS devices (NEMS), with a co-advisor from Cornell University. He earned his bachelor's degree from King Fahd University of Petroleum and Minerals (FUPM). He has a research collaboration with the University of California Irvine and Cornell University.

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Received date: 22-09-2022 | Accepted date: 25-09-2022 | Published date: 23-03-2023

Photocatalytic performance improvement by doping ag on zno/mwcnts nanocomposite prepared with pulsed laser ablation method based photocatalysts degrading rhodamine b organic pollutant dye

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ZnO/MWCNTs nanocomposite has significant potential in photocatalytic and environmental treatment. Unfortunately, its photocatalytic efficacy is not high enough due to its poor light absorbance and quick recombination of photo-generated carriers, which might be improved by incorporation with noble metal nanoparticles. Herein, Ag-doped ZnO/MWCNTs nanocomposite was prepared using a pulsed laser ablation approach in the liquid media and examined as a degradable catalyst for Rhodamine B. (RhB). Different techniques were used to confirm the formation of the nanostructured materials (ZnO and Ag) and the complete interaction between them and MWCNTs. X-ray diffraction pattern revealed the hexagonal wurtzite crystal structure of ZnO and Ag. Additionally, UV-visible absorption spectrum was used to study the change throughout the shift in the transition energies, which affected the photocatalytic degradation. Furthermore, the morphological investigation by a scanning electron microscope showed the successful embedding and decoration of ZnO and Ag on the outer surface of CNTs. Moreover, the oxidation state of the formed final nanocomposite was investigated via an X-ray photoelectron spectrometer. After that, the photocatalytic degradations of RhB were tested using the prepared catalysts. The results showed that utilizing Ag significantly impacted the photodegradation of RhB by lowering the charge carrier recombination, leading to 95% photocatalytic degradation after 12 min. The enhanced photocatalytic performance of the produced nanocomposite was attributed to the role of the Ag dopant in generating more active oxygen species. Moreover, the impacts of the catalyst amount, pH level, and contact time were discussed.

Recent Publications:

1. Reham A. Rezk, Ayman M. Mostafa, "Optimized experimental parameterization for single and double LIBS pulses towards steel alloy in different gaseous media"

2. Reham A. Rezk, M. A. I. Essawy, Ayman M. Mostafa, "Qualitative analysis of different roasted coffee beans using Laser Induced Breakdown Spectroscopy"

3. Arafat Toghan, Eman A. Mwafy, Ayman M Mostafa, Reham A Rezk, "Adsorption of phosphate ions from water using PVA-NiO nanocomposite based on tuning influence of pulsed laser ablation method", Physica Spectra, 98 (2023).

Biography

Reham A. Rezk (Ph.D., 2017), Lecturer of Physics at (HTI), Egypt. She is interested in Applied laser physics research; especially Laser Induced Breakdown Spectroscopy (LIBS), Pulse Laser Ablation in Liquid (PLAL) with nanomaterials. She has a list of 9 scientific papers. Now, she is interested in laser physics with simultaneous theoretical identifications (Chemometrics analysis). She is a member of the Optical Society of America (OSA), the Institute of Electrical and Electronics Engineers (IEEE), and Professor Nabil A. Abdel Ghany lab at the National Research Center Institute in Egypt. As well as the Applied Laser Spectroscopy Group (ALS) at National Institute of Laser Enhanced Sciences (NILES), Cairo University in Egypt. She has attended and participated in several international conferences and workshops regarding her field of specialization and teaching quality.

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Received date: 28-10-2022 | Accepted date: 01-11-2022 | Published date: 23-03-2023

Single & two phase nanofluids flow and the advancement in nanotechnology

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The advanced classification of heat transferring materials is known as nanofluids. A high saturation/suspension of nanoparticles of diameter within 1-100 nanometers is dispersed in some typical base fluids to formulate nanofluids. The classification is further classified as hybrid nanofluids when two or more types of nanoparticles are mixed in one base fluid, say water (in this case). Plenty of liquids can be used as base fluids for hybrid nanofluid formulation; however, water, ethylene, organic liquids, engine oil, bio-fluids, and polymeric solutions are best known. A similar classification is extended with the type of nanoparticles involved in this procedure. Usually, carbon nanotubes, diamond, graphite, metals like gold, copper, silver, and metal oxides like zirconia and Titania are commonly used. The governing equations strictly follow the Navier Stokes equations model in the form of highly nonlinear PDEs. Numerous numerical methods are used to solve the PDEs directly or firstly convert them into ODEs using suitable transformations and solve the nonlinear ODEs using numerical schemes. The impact of volume fraction of nanoparticles, the type of medium, type of base fluid, and many other essential parameters are of significant importance to see the rheological behavior of the nanofluids. In addition, skin friction, heat, and mass transfer rates are analyzed. The findings are critical in many industrial and engineering applications of nanofluids such as pharmaceutical productions, bio-medicine, nuclear actor/reactors, heat exchangers, modeling of geothermal procedures, oil-based reservoirs, and groundwater systems of water management, efficient mechanical devices, etc. Recently, the numerical results are also tested experimentally to validate the findings.

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1. G. Rasool, N. A. Shah, E. R. El-Zahar, A. Wakif, Numerical Investigation of EMHD Nanofluid Flows over a Convectively Heated Riga Pattern Positioned Horizontally in a Darcy-Forchheimer Porous Medium: Application of Passive Control Strategy and Generalized Transfer Laws, Waves in Random and Complex Media, (2022); 10.1080/17455030.2022.2074571.

2.G. Rasool et al. Darcy-Forchheimer flow of water conveying MWCNT nanoparticles through Vertical Cleveland Z Staggered Cavity subject to Entropy Generation, Micromachines, Micromachines 2022, 13(5), 744LiX, SchwachaMG, ChaudryIH, ChoudhryMA (2008)Acutealcohol intoxication potentiates neutrophil-mediated intestinal tissue damage after burn injury. Shock 29:377.

3.G. Rasool, A. Shafiq, S. Hussain, M. Zaydan, A. Wakif, A. J. Chamkha, M. S. Bhutta, Significance of Rosseland's Radiative Process on Reactive Maxwell Nanofluid Flows over an Isothermally Heated Stretching Sheet in the Presence of Darcy–Forchheimer and Lorentz Forces: Towards a New Perspective on Buongiorno's Model. Micromachines 2022, 13, 368. https://doi.org/10.3390/mi13030368.

Biography

Rasool has received his Ph.D. degree in Applied Mathematics from Zhejiang University, China. His research includes the areas of Fluid dynamics, MHD flows, nanofluids, theoretical Physics, Differential Equations, and Mathematical modeling of real-world problems in mechanical engineering. He is Potential Reviewer and Editorial board member of several international journals.

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Received date: 21-01-2023 | Accepted date: 23-01-2023 | Published date: 23-03-2023

On Spin Entropy

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Two types of randomness are associated with a mixed quantum state: the uncertainty in the probability coefficients of the constituent pure states and the uncertainty in the value of each observable captured by the Born's rule probabilities. Entropy is a quantification of randomness, and we propose a spin-entropy for the observables of spin pure states based on the phase space of a spin as described by the geometric quantization method, and we also expand it to mixed quantum states. This proposed entropy overcomes the limitations of previously-proposed entropies such as von Neumann entropy which only quantifies the randomness of specifying the quantum state. As an example of a limitation, previously-proposed entropies are higher for Bell entangled spin states than for disentangled spin states, even though the spin observables are less constrained for a disentangled pair of spins than for an entangled pair. The proposed spin-entropy accurately quantifies the randomness of a quantum state, it never reaches zero value, and it is lower for entangled states than for disentangled states.

Recent publications:

1. Geiger, D.; Kedem, Z.M. Spin Entropy. Entropy 2022, 24, 1292. https://doi.org/10.3390/e24091292

2. Geiger, D.; Kedem, Z.M. On Quantum Entropy. Entropy 2022, 24,1341. https://doi.org/10.3390/e24101341

Biography

Davi Geiger is an Associate Professor of Computer Science at the Courant Institute of Mathematical Sciences and of Neural Science, New York University.He received the BS in Physics at PUC Rio de Janeiro, Brasil and the Ph.D in Physics and Artificial Intelligence at MIT with Professor Tomaso Poggio.Before coming to NYU, he spent three years at Siemens Corporate Research in Princeton. He has received an NSF Career award.

Zvi Kedem is a former Professor and past Chair of the Department of Computer Science at the Courant Institute of Mathematical Sciences at New York University. After earning his D.Sc. at the Technion – Israel Institute of Technology, and before joining NYU, he taught at Columbia University, MIT, SUNY at Stony Brook, and UT at Dallas. He has conducted research in a variety of areas, including Computer Graphics, Database Systems, Data Mining, Parallel and Distributed Computing and Systems, and Quantum Physics. As a principal and co-principal investigator he has obtained more than $10,000,000 in research funding and has authored and co-authored more than 50 scientific publications. He has served on funding and review panels, program committees of scientific meetings, and editorial boards of scientific journals. He has guided the dissertation research of more than 15 doctoral students and has more than 200 doctoral descendants. His professional achievements have been recognized by elections to the grade of Fellow by ACM, EurASc, and IEEE. For his lengthy volunteer work as the Editor in Chief of the ACM Computing Classification System Update Project he was recognized with the 2012 Outstanding Contribution to ACM Award.

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Received date: 13-12-2022 | Accepted date: 15-12-2022 | Published date: 23-03-2023

Self-assembly of amphiphilic block copolymers: polymeric micelles to polymersomes as drug delivery vehicles

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Self-assembly of amphiphilic block copolymers display a multiplicity of nanoscale periodic patterns proposed as a dominant tool for the 'bottom-up' fabrication of nanomaterials with different levels of ordering. This talk emphasizes on the recent developments in the formation and properties of various nanostructured aggregates resulting from the self-assembly of a variety of block copolymers (BCPs) in an aqueous solution. We briefly describe the BCPs, their types, microdomain formation in bulk and micellization in selective solvents. The research on amphiphilic BCP self-assembly in aqueous solutions has progressed very rapidly with the advances in controlled radical polymerization techniques and emerging applications in technological/biomedical fields most notably as vehicle for drug delivery systems. We also discuss the characteristic features of block copolymers nanoaggregates viz., polymer micelles (PMs) and polymersomes. The solution behavior of amphiphilic BCPs are validate with various characterization techniques such as tensiometry, spectral, thermal, diffraction, scattering and microscopy are discussed to understand the nanoscale self-assembly of these BCPs. The simple preparation and the scalability of micelles from BCPs offer many potential applications as emulsifiers, hydrogels and drug delivery vehicles. Amphiphilic BCPs (with a variety of hydrophobic blocks and hydrophilic blocks; often polyethylene oxide) self-assemble in water to micelles/niosomes similar to conventional nonionic surfactants with high drug loading capacity. Applications of these BCP micelles and polymersomes as nanocarriers in drug delivery systems are discuss.

Recent Publications:

1. D. Patel, K. Kuperkar, P. Bahadur, Temperature stimulated self-association and micellar transition for star shaped normal and reverse EO-PO block copolymers and their mixed systems as potential use for anticancer drug solubilization., 2022, Soft Matter, 2022, 18, 4543.

2. D. Patel, R. Jana, M. Lin, K. Kuperkar, D. Seth, L. Chen, P. Bahadur, Salt triggered micellar behavior of a very hydrophilic triblock copolymer Pluronic® F88: Revisiting self-assembly using multitechnique approach., Colloid Polym. Sci., 2021, 229.

3. D. Patel, S. Rathod, S. Tiwari, D. Ray, K. Kuperkar, V. K. Aswal, P. Bahadur, Self-association in EO−BO−EO triblock copolymers as a nanocarrier template for sustainable release of anticancer drugs., J. Phys. Chem. B., 2020, 124, 51, 11750–11761.

Biography

Dhruvi Patel has her expertise in scrutinize the self-assembly of block copolymers for various delivery system. She has done Ph.D. in Chemistry at Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat, INDIA. Currently she is an associate as researcher with Cornell University, USA. Her research focuses on the exploration of self-assembly and aggregation behavior of block copolymers for targeted applications. She has published several research articles including book chapters in reputed tier II journals.

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Received date: 22-09-2022 | Accepted date: 26-09-2022 | Published date: 23-03-2023

A Stackelberg Game Theory Based Demand Response Algorithm for Domestic Consumers

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Electric demand of the consumers is increasing day by day. Energy consumption profile is also random in nature. To mitigate these two problems an optimization is required. The demand of the consumers is managed by integration of renewable energy sources but these sources are depending upon weather constraints. Therefore, a proper forecasting is required to predict the generation and make the consumers available to consumer that electricity. At consumer end if electricity is provided at a certain time to low cost, there might be a chance of new peak consumption. To mitigate the problem an optimization is required. A lot of optimization methodologies such as fuzzy logic approach, artificial intelligence, game theory etc. are available for energy management at consumer end. In this presentation we will discuss the game theory method and in particular Stackelberg game for optimization of energy demand at consumer end. A Stackelberg game algorithm is proposed to optimize real time demand response equilibrium between consumers and utilities with the integration of renewable energy sources. Stackelberg game is played between one leader and N followers to provide interaction between utility and consumers in the presence of energy management center. The objective of consumers is to minimize their energy tariffs by scheduling their appliances. Appliances are categorized as non-shiftable, shiftable and curtailable appliances based on their applications as shown in Fig. The objective of the utility is to maximize its profit by managing peak to average energy consumption ratio, penetration of renewable energy sources as a primary source and during peak hours, integrate electric vehicles as a backup. The existence of a unique Stackelberg equilibrium that provides an optimal energy consumption scheme to each appliance at the consumer end was demonstrated. The simulation results showed the optimal real time demand response using Stackelberg game algorithm is effective for achieving the optimal load control.

Recent Publications:

1. Agrawal, H., Talwariya, A., Gill, A., Singh, A., Alyami, H., Alosaimi, W., & Ortega-Mansilla, A. (2022). A Fuzzy-Genetic-Based Integration of Renewable Energy Sources and E-Vehicles. Energies, 15(9), 3300.

2.Talwariya, A., Singh, P., & Kolhe, M. L. (2021). Stackelberg Game Theory Based Energy Management Systems in the Presence of Renewable Energy Sources. IETE Journal of Research, 67(5), 611-619.

3.Talwariya, A., Singh, P., Kolhe, M. L., & Jobanputra, J. H. (2020). Fuzzy logic controller and game theory based distributed energy resources allocation.

Biography

Akash Talwariya received his PhD degree from JK Lakshmipat University in Electrical Engineering on " Game theory based electrical power system optimization in the presence of distributed energy resources". Dr. Talwariya completed his postgraduate in Artificial Intelligence and Machine Learning from the National Institute of Technology, Warragal, India. He received his M.Tech and B.Tech in power systems and electrical engineering from Rajasthan Technical University, Kota, Rajasthan, India. He joined the department of Electrical Engineering at L&T EduTech,India as a Teaching Associate. His current research interests include smart grids, game theory, machine learning, demand-side management, and future network architectures.

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Received date: 28-10-2022 | Accepted date: 01-11-2022 | Published date: 23-03-2023

Alkaline hydrothermal vents as a potential site for thermal chemical reactions

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Simpler compounds or elements like CO2, CH4, H2O (vapor), a small amount of NH3, and CO or N2-like materials with the continuous supply of thermal energy in hydrothermal vents can be possible to do structural modification to form stable compounds as deriving force. Alkaline hydrothermal vents are minerals-rich (Fe, Ni, S, and silica) and supplied with a temperature fluctuation of 400°C to lower as we move away from it temperature decreases significantly, high pressure, active serpentinization fluids, reductive conditions and more important difference in concentration gradient are attributing to high interaction of materials at a single site. A combination of such events at one location can increase the chances of effective collisions, leading to possible combinations with different structural modifications.

Plumes of Enceladus show the significant similarity of deep-sea hydrothermal vents condition with change in their ranges, even though the data shows 20 times more organic matter than expected in plumes. We are aimed to study the ∑CO2 to synthesize C2+ hydrocarbons in deep- sea hydrothermal vents in presence of rich H2 and minerals with the chimney-like formation and the chemistry of three phases of water present on the planetary body with its possible application in biogenesis. Different research studies of analog sites and similar simulations at the laboratory favor complex material synthesis even though in an experiment the resultant shows imidazole presence. We are expected to formulate the study of potential changes in C/O/N summations with regards to the further fate of synthesized materials in deep-sea hydrothermal vents at Enceladus regarding earth even though variations are expected with natural changes in combinations of chemicals formed there. These conclusions can frame the basic information of life processes and their emergence with time and relative study of complexity increment.

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Biography

Manya Sharma is a geologist by profession, Mentor at SGAC 2022 mentoring program, and currently Heading the Department of Astrobiology at Spaceonova. successfully leaded Astrobiological research in Mars Analogue Site Expedition 2022 (MASE 2022) in strategic sites of Rajasthan, India. Certification of achievement involving the International Advanced Space Science course, and Diploma in Astrobiology from the Indian Astrobiology Research Foundation. My professionalism covers -Remote sensing, QGIS, ArcGIS Pro, encom discover, also as a global mapper & Google Earth and hyperspectral and multispectral remote sensing.

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Received date: 03-12-2022 | Accepted date: 06-12-2022 | Published date: 23-03-2023

Ideas off isaac newton and their computer implementation

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This article outlines Isaac Newton's most significant contributions to mathematics and physics and their computer implementation. The following two software tools were used to describe the results: Wolfram Mathematica and Java3D. Isaac Newton laid the foundations of differential and integral calculus. Through the principles of the method of fluxes, he expresses the reciprocal nature of the operations of integration and differentiation. He is writing the integrals and derivatives in two columns. With the help of Wolfram Mathematica software, it is easy to confirm Newton's discovery by drawing graphs. At the same time, with this discovery, the scientist laid the foundations of numerical methods, which, as is known today, can be used with the help of the computer. Newton was the first to introduce the concept of limit, which is known to be used in mathematical analysis. He presents it by the method of limits in 12 lemmas. In this paper, a new approach based on the method is given, with the help of which the computer can draw a regular polygon, and its face can be calculated subsequently. The main goal of the proposed new boundary method is to reach the boundary of an inscribed regular polygon in a circle. The study begins by drawing a regular polygon with three vertices. After that, the number of vertices increases without limit until describing a circle. Newton explains this concept also physics-mathematically. Today his method is very relevant as it is directly related to the computer and its graphic capabilities. The Java programming language and specifically the Java3D library were used to describe these results.

Recent publications:

1.Lebamovski, P.:The Effect of 3D technologies in stereometry training. CBU International Conference Proceedings, Vol. 1, pp. 68-74. (2021) https://doi.org/10.12955/pns.v2 .155

2.Newton, I. (2002). “The Mathematical principles of natural philosophy”. Edited by David R. Wilkins.

3.Lebamovski, P., Petkov, E.:Usage of 3D technologies in stereometry training. CBU International Conference Proceedings, Vol.1 (2020), pp. 139-146. (2020).

Biography

Penio Dimitrov Lebamovski, workplace - Bulgarian Academy of Sciences, Institute of Robotics, Sofia №1113. Obtained a bachelor's degree in the city of Veliko Tarnovo, Veliko Tarnovo University "St. St. Cyril and Methodius", in 2014. Major "Mathematics and Informatics". In 2016, he obtained a master's degree.

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Received date: 21-01-2023 | Accepted date: 23-01-2023 | Published date: 23-03-2023

Green and bioinspired nanoparticles for nanomedicine applications

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In recent decades, the role of bioinspired hybrid nanoparticles synthesis and application in the filed of nanomedicine has attracted great attention. In this talk we will present two classes of nanomaterials with different physical chemical characteristics that would be very promising for the development of nanodrugs against cancer, aging and inflammation. Inspired by the biosilica morphogenesis, which takes place inside the diatom cell within the silica deposition vescicle, we set up a biomimetic/bioinspired design and synthesis of structural and functional hybrid organic/inorganic SiO2-based nanostructures, which present many distinctive advantages over traditional chemical synthesis methods. The intriguing ability of diatom long chain polyamines to rapidly induce precipitation of SiO2 spheres has motivated the in vitro one-pot synthesis of SiO2 particles. Therefore, the templating by amine-bearing molecules is seen as a successful biomimetic approach for the synthesis of SiO2-based hybrids under mild and environmentally friendly conditions for biosensing and biomedical applications [1]. Moreover, we recently developed a new one-pot green synthetic route, by using leaves extract of Laurus nobilis, to obtain monodispersed ultrasmall SiO2 NPs without the use of dangerous chemicals [2]. By means of morphomechanical studies we demonstrated that the green SiO2 NPs compromised cells to a lesser extent than the other SiO2 NPs types, thus confirming that there is a link between the cell elasticity and the physicochemical properties of NPs [3]. The gold nanoparticles-based cancer therapy is at the centre of many debates. Their physical-chemical properties are suitable to induce thermal stress in tissues, making them powerful tools to selectively kill cancer cells. However, the synthetic route residuals and the capping agents used to obtain gold NPs, often induce the strong activation of macrophages inflammatory response, limiting their further applications in the human body. We developed a simple green method to obtain stable and spherical small gold nanoparticles capped with polyphenols. The polyphenols shelled NPs were used in macrophages cell line to test key inflammation-related markers. We prove the potential of polyphenols shelled NPs to strongly promote the inflammation shutdown, making them as heat synergists in the thermal treatment of breast cancer cells. Our results demonstrate that the combined strategy markedly exerts the anticancer effect against the breast cancer cells, while none of the single treatment induced such changes [4,5].

Recent publications:

1. Della Rosa, G., Di Corato, R., et al. (2020). “Tailoring of silica-based nanoporou s pod by spermidine multi-activity.” Sci Rep 10, 21142 2. Valeria De Matteis, Mariafrancesca Cascione, Agnese De Luca, Daniela Erminia Manno, Rosaria Rinaldi. 2022. "High Doses of Silica Nanoparticles Obtained by Microemulsion and Green Routes Compromise Human Alveolar Cells Morphology and Stiffness Differently", Bioinorganic Chemistry and Applications, vol. 2022, Ar ticle ID 2343167, 23 pages, 2022.

3. Cascione, Mariafrancesca, Valeria De Matteis, Giacomo Mandriota, Stefano Lep oratti, and Rosaria Rinaldi. 2019. "Acute Cytotoxic Effects on Morphology and M echanical Behavior in MCF-7 Induced by TiO2NPs Exposure" International Journal of Molecular Sciences 20, no. 14: 3594.

4. De Matteis, Valeria, Mariafrancesca Cascione, Loris Rizzello, Daniela Erminia Ma nno, Claudia Di Guglielmo, and Rosaria Rinaldi. 2021. "Synergistic Effect Induce d by Gold Nanoparticles with Polyphenols Shell during Thermal Therapy: Macroph age Inflammatory Response and Cancer Cell Death Assessment" Cancers 13, no. 14: 3610.

5. De Matteis, Valeria, Loris Rizzello, Mariafrancesca Cascione, Eva Liatsi-Douvitsa, Azzurra Apriceno, and Rosaria Rinaldi. 2020. "Green Plasmonic Nanoparticles an d Bio-Inspired Stimuli-Responsive Vesicles in Cancer Therapy Aplication" Nanom aterials 10, no. 6: 1083

Biography

Rosaria Rinaldi is currently Full Professor of Condensed Matter Physics at the Dept. of Mathematics and Physics of University of Salento, and she is a member of the Academic University Senate. Since 2019 she is Member of the Ministry of University and Research (MUR) Evaluation Committee for Strategic Projects to be implemented by public research institutions. Prof. Rinaldi is currently in charge of the research center in "Nanomedicine, Nanobioelectronics and Nanobiotechnology", at University of Salento. In 2005 she was awarded the medal of "Le Scienze" and the medal of the President of the Republic for research carried out in the field of Nanobiotechnology. She was head of the Natural Sciences Department of and vice-director of University excellence school ISUFI till 2020. She won the "ITWIIN-High Education" award in 2016) She has been coordinating more than 30 scientific projects at regional, national and EU level, in the last 15 years. R.R. is author and co-author of about 330 papers published in international scientific journals,13 monographs and book chapters, and 12 patents (H-index:46).

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