Optical spectroscopy and structural analysis of germanate-tellurite glasses with low doping of Er3+ ions

Abstract:

Rare-earth-doped glasses, have garnered significant interest in photonics and optical communication due to their unique luminescent properties. However, there is a critical need for research focused on low-doping levels of Er3+ ions in germanate-tellurite glasses, due to when there are few Er3+ ions in a glass matrix, these ions could be approximated with quantum emitters. The existing literature predominantly focuses on high doping concentrations of Er3+ ions in glasses, overlooking the subtleties and advantages associated with low doping levels. This research addresses this gap by exploring the optical behavior and structural nuances in germanate-tellurite glasses doped with low concentrations of Er3+ ions. We synthesized germanate-tellurite glasses doped with low concentrations of Er3+ ions using a melt-quenching technique. Optical spectroscopy techniques were employed to characterize the luminescent properties. Additionally, structural analysis was conducted to understand the Er3+ ions influence in the glass structure. These results (which?) open doors to potential applications in optical amplification and photonics. Our comprehensive analysis of the optical and structural properties provides a foundation for further exploration in the field of photonics and optical communication.

Good structure, but long background. More results should be given. Mention to methodology was not necessary

Abstract correction with ChatGPT:

"Rare-earth-doped glasses have garnered significant attention in the fields of photonics and optical communication owing to their distinctive luminescent properties. However, there exists a critical need for research focused on low doping levels of Erbium (Er3+) ions in germanate-tellurite glasses. When Er3+ ions are sparsely dispersed within a glass matrix, they exhibit characteristics akin to quantum emitters. The existing literature predominantly concentrates on high doping concentrations of Er3+ ions in glasses, often overlooking the subtle yet advantageous traits associated with low doping levels. This research effectively addresses this void by delving into the optical behavior and structural intricacies of germanate-tellurite glasses, which have been judiciously doped with low concentrations of Er3+ ions. Our methodology involves the synthesis of these glasses through a melt-quenching technique, followed by the utilization of optical spectroscopy to meticulously characterize their luminescent properties. Additionally, structural analysis has been systematically conducted to gain insight into the influence of Er3+ ions on the glass structure. These results not only unveil new possibilities for applications in optical amplification and photonics but also provide a comprehensive foundation for further exploration in the domain of photonics and optical communication."

Did not improve much, as original text was already good. Too verbose.

**File Systems Impact on Power Consumption in eMMC-Based Embedded Computers**

Abstract. The advances in microelectronics have substantially increased the embedded systems capacity, nowadays, a significant part of these solutions contains processor units that supports traditional operating systems, such as Linux-based distributions. However, these systems are frequently disposed in environments with restricted energy resources, which makes essential to select a file system to the data memory that saves energy. Despite that, several performance evaluation studies in the field are limited to systems with NAND Flash as data memories and only measure the time efficiency of the file systems. To overcome these limitations, we evaluated the performance on embedded computers with eMMC to understand the impact of different file systems on their power consumption. We first generate a minimal Linux image with a script that creates, reads, writes and deletes thousand of random files in the root file system partition. Then, we insert this image in the data memory three times, and each time the root file system partition is formatted with a different file system (EXT4, BTRFS and F2FS). Measurements of the mean time and the mean power consumption of each execution are performed by an external microcontrolled device. From the experimental results (which?), it can be inferred that the BTRFS is the best option for power saving when creating, reading and deleting files with random content and size, on the other hand, the EXT4 excelled in writing operations. Our approach didn’t include other factors that must be considered in robust projects, such as the file systems safety and recovery, but it provides important data and information to developers involved in embedded systems projects that demands countless file operations.

Good structure, but long background

Abstract. Advancements in microelectronics have significantly expanded the capacity of embedded systems. Today, a substantial portion of these solutions incorporates processor units supporting traditional operating systems, such as Linux-based distributions. Nevertheless, these systems are often deployed in energy-restricted environments, necessitating the careful selection of a file system for the data memory to optimize energy conservation. Despite this imperative, many performance evaluation studies in the field focus solely on systems with NAND Flash as data memories, concentrating solely on time efficiency. To address these limitations, this study presents a performance evaluation of embedded computers with eMMC, aiming to comprehensively understand the influence of various file systems on power consumption. To achieve this objective, we have developed a minimal Linux image with a script capable of creating, reading, writing, and deleting numerous random files within the root file system partition. This image is loaded into the data memory three times, each time with the root file system partition formatted with a different file system (EXT4, BTRFS, and F2FS). Measurements of both mean time and mean power consumption for each execution are meticulously conducted using an external microcontrolled device. The experimental results reveal that BTRFS stands out as the optimal choice for energy conservation during operations involving the creation, reading, and deletion of files with varying content and size. Conversely, EXT4 excels in writing operations. It is worth noting that this study does not encompass other essential considerations in robust projects, such as file system safety and recovery. However, it furnishes crucial data and insights for developers immersed in embedded systems projects that necessitate extensive file operations.

Did not improve much. Unnecessary words

PAPER TITLE: Compact Bow-tie Femtosecond Laser Cavity: Development,

Optimization and Performance Evaluation

ORIGINAL ABSTRACT:

Bow-tie cavity configurations allow efficient and stable resonator operation, for short pulse operation and high repetition rate pulses, a versatile and reliable option for a variety of applications. There is an abundance of literature on theoretical treatment and applications of this laser configuration, however there is a lack of guidance on the practical development. To address this gap, it is discussed the complete process of precision laser cavity alignment through a compilation of analysis and optimization techniques, highlighting the procedures required to achieve laser action and optimize the laser in continuous wave operation, ultimately reaching the modelocked regime through Kerr Lens Mode-locking technique. This article presents a theoretical review and analysis for this configuration and describes an application of the development, optimization, and performance evaluation of a compact bow-tie Ti:Sapphire femtosecond laser cavity with dispersion-compensating mirrors, which is capable of generating ultrashort pulses with high repetition rates. Finally, we characterize the laser output parameters, revealing that we were able to achieve a low-energy pulse of 0,4nJ with a high-repetition rate of 1GHz and a pulse duration of 51fs. This work can be useful for researchers and engineers who aim to develop compact and high-performance femtosecond lasers for various applications, including biomedical imaging, laser-assisted surgery, spectroscopy and optical frequency combs.

Is it a review paper? Purpose is not well defined

ABSTRACT (with GPT-3 revision):

Bow-tie cavity configurations have gained significant attention due to their efficacy in facilitating stable resonator operation. These configurations are particularly valuable for applications requiring short pulse operation and high repetition rate pulses, offering versatility and reliability. While there is an extensive body of literature addressing the theoretical aspects and applications of this laser configuration, there exists a noticeable gap in guidance pertaining to practical development. Practical insights and systematic approaches for precision laser cavity alignment, which are crucial for achieving desired outcomes, remain relatively scarce. To bridge this critical gap, this paper endeavors to comprehensively elucidate the precise process of aligning a laser cavity. It achieves this by compiling a range of analytical and optimization techniques, with a specific focus on delineating the necessary steps for attaining laser action. Furthermore, the article aims to shed light on the optimization required for continuous wave operation, ultimately leading to the attainment of the highly sought-after modelocked regime through the application of the Kerr Lens Mode-locking technique. The paper conducts a thorough theoretical review and analysis of the bow-tie cavity configuration. It offers a detailed account of its development, optimization, and performance evaluation, underscoring the significance of dispersion-compensating mirrors. The practical application of the developed bow-tie Ti:Sapphire femtosecond laser cavity is highlighted. This laser system demonstrates remarkable capabilities in generating ultrashort pulses characterized by high repetition rates. Specifically, the output parameters indicate the achievement of a low-energy pulse of 0.4nJ, boasting a substantial repetition rate of 1GHz and an impressively short pulse duration of 51fs. This work carries substantial implications for both researchers and engineers seeking to embark on the development of compact and high-performance femtosecond lasers. These lasers find utility across a spectrum of applications, encompassing biomedical imaging, laser-assisted surgery, spectroscopy, and optical frequency combs. In essence, the paper's contribution lies in its provision of a comprehensive roadmap for practical laser cavity alignment, complemented by the successful realization of a cutting-edge femtosecond laser system, promising exciting advancements in diverse fields.

Too verbose

FINAL ABSTRACT (with GPT-3 revision and my second revision):

Bow-tie cavity configurations have gained significant attention due to their efficacy in facilitating stable resonator operation. These configurations are particularly valuable for applications requiring short pulse operation and high repetition rate pulses, offering versatility and reliability. While there is an extensive body of literature addressing the theoretical aspects and applications of this laser configuration, there exists a gap in guidance pertaining to practical development. Practical insights and systematic approaches for precision laser cavity alignment, which are crucial for achieving desired outcomes, remain relatively scarce. To bridge this critical gap, this paper endeavors to comprehensively elucidate the precise process of aligning a laser cavity. It achieves this by compiling a range of analytical and optimization techniques, delineating the necessary steps for optimization required for continuous wave operation, ultimately leading to the attainment of the modelocked regime through the Kerr Lens Mode-locking technique. The paper conducts a thorough theoretical review and analysis of the bow-tie cavity configuration, offering a detailed account of a Ti:Sapphire femtosecond laser cavity development, optimization, and performance evaluation using dispersion-compensating mirrors. Furthermore, the output parameters indicate the achievement of a low-energy pulse of 0.4nJ, boasting a substantial repetition rate of 1GHz and an impressively short pulse duration of 51fs. This work can be useful for researchers and engineers seeking to embark on the development of compact and high-performance femtosecond lasers, by providing a comprehensive roadmap for practical laser cavity alignment, complemented by the successful realization of a femtosecond laser system. These lasers find utility across a spectrum of applications, encompassing biomedical imaging, laser-assisted surgery, spectroscopy, and optical frequency combs.

A systematic review of Empathic games mechanics’ to support therapeutic and pedagogic activities of people with intellectual disabilities.

In the simulated spaces that video games offer, Empathic games are gaining attention of the academic community in recent years. These games are designed to make the player understand the reality of someone else’s life and their challenges, such as: blindness, depression, financial difficulty etc. This article investigates in this emerging field how scholars and specialists are describing, communicating, and designing empathic games to support the therapeutic needs of people with intellectual disabilities. A systematic literature review (SLR) was performed where it was defined its protocol, research questions (such as: What is the profile of this demographic? What games do they play? What are their main issues when playing games? etc.), and the recorded metrics. While we found a number of works that highlight the importance of empathy and general guidelines on how to achieve it in games; we found about twenty works that are related to this study’s objective, however they did not yield satisfactory findings surrounding the game mechanics and narratives that are impactful with this demographic (too long). Our findings mostly showed how games are important to keep intellectually disabled individuals to stay mentally active, to create bonds with other players, and to improve their memory and communication skills on and off the game, and other findings that evidence that games can support the therapeutic needs of this public, just that they were not empathic with them. We discuss these results due to the relative newness of the topic, and that investigations in this specific public are on its beginnings. Therefore we hope our research calls the academic community to action to investigate this matter further, so that this demographic and other researchers can get a better understanding of how games need to be specifically designed to support and better deal with their disabilities.

Good structure. Long sentences

A systematic review of Empathic games mechanics’ to support therapeutic and pedagogic activities of people with intellectual disabilities.\*

Video games are increasingly being recognized for their potential to simulate lived experiences, giving rise to the emergence of "Empathic games". These games are intentionally crafted to allow players to step into the shoes of another, understanding the challenges faced by individuals from diverse backgrounds, such as those with blindness, depression, or financial difficulties. This paper delves into the nascent domain of how empathic games can serve the therapeutic needs of individuals with intellectual disabilities. We conducted a systematic literature review (SLR), setting a defined protocol and research questions. These questions included the profile of the demographic, the types of games they play, and the challenges they encounter in gaming contexts. While numerous works underscored the general importance of empathy in game design, only a limited subset specifically pertained to the therapeutic needs of those with intellectual disabilities. Alarmingly, these studies did not present conclusive insights into the game mechanics and narratives that resonate most with this audience. Our analysis primarily underscored the role of games in stimulating intellectual activity, fostering social connections, and enhancing memory and communication skills for individuals with intellectual disabilities. However, a glaring gap exists in how these games are tailored to authentically empathize with their experiences. Given the novelty of this subject, our results can be attributed to the nascent state of research focusing on this particular demographic. We hope this review acts as a clarion call, urging the academic community to delve deeper. It's imperative to understand the specific design considerations that can empower these games to effectively support individuals with intellectual disabilities and enrich their lives.

Did not improve, as original text was already good

\*Ajustado segundo ChatGPT

Abstract

The earth’s health and conservation have been trending topics nowadays, and many studies on biodiversity and ecological conservation are being conducted. In this context, Acoustic Ecology is a field of growing interest because of the implications it has for understanding the acoustic dynamics of the environment, leading to the characterization of the environment as soundscapes. To study soundscapes, it is common to use Passive Acoustic Monitoring (PAM), which remains on massive audio capturing and processing. However, rapid advances in technology make it possible to record large audio datasets, it is not simple to analyze such data, once it is a large volume of unstructured data. The technical challenge we investigate in this study is to devise an open-source visualization framework that assists conservation specialists in assessing large collections of environmental soundscape data. The visualization techniques and the usability of the framework were assessed by researchers from the São Paulo State University in five usability experiments. The data used in this study was collected by the same research laboratory that assessed the proposed framework, and it is characterized by audio files recorded in the ecological continuum of Cantareira-Mantiqueira (does not add much information). Initial results indicated that the use of the proposed framework reduced the data analysis time by 20% and enabled nontrivial data visualizations with a low code implementation. The proposed framework tends to be efficient in the fast visualization of eco-acoustic data and demonstrates the capacity to improve specialist analysis with visualizations that extract deep information from the data.

Good structure. Could do with more results

Abstract revised by ChatGpt

In today's discourse on Earth's health and conservation, biodiversity and ecological preservation studies are gaining momentum. Acoustic Ecology, an emerging field, is of particular interest due to its potential to unveil the auditory intricacies of the environment, thereby framing it as a dynamic soundscape. Passive Acoustic Monitoring (PAM) is commonly employed to explore soundscapes, but rapid technological progress has resulted in the accumulation of vast, unstructured audio datasets, posing a formidable analytical challenge. This study addresses this challenge by developing an open-source visualization framework aimed at aiding conservation specialists in assessing extensive collections of environmental soundscape data. Researchers from São Paulo State University rigorously evaluated the framework's visualization techniques and usability through five usability experiments. The dataset utilized in this study, sourced from the Cantareira-Mantiqueira ecological continuum, aligns with the research laboratory's efforts that assessed the framework. Preliminary findings are encouraging, showcasing a 20% reduction in data analysis time and enabling advanced data visualizations with minimal coding. The framework's potential to expedite eco-acoustic data visualization and enhance specialist analyses by extracting profound insights is evident.

Did not improve much

Inappropriate disposal of effluents contaminated with a high teor of organic dyes, recalcitrant substances and additives used in processing, have been caused a major disruption to the aquatic and the environment ecosystem as a whole. The most common trataments used in industrial effluents are biological treatments using activated sludge and physical-chemical treatments using precipitation-coagulation or adsoption. However, several chemical structures, mainly dyes structures, resist the action of microorganisms, making it difficult to remove contaminants. The use of heterogeneous photocatalysis methods to catalyze organic dye molecules has been a kye to this problem and, consequently, the search for news photocatalysts with greater catalysis power has increaded. Here we seek to synthesize Ti/Ta alloys prepared for the first time by the Pechini chemical route to improve the catalysis power of Titanium. For this goal, Titanium and tantalum citrates were prepared and mixed over heat at 80oC, and ethylene glycol was added in solution, to induce the polimerization. The solution was heated at 110oC and allowed to reduce until it becomes a resin. The resin was calcinad at 900oC for 4 hours and the material is obtained in powder form. The mass proportion of each component of the Ti/Ta alloy was varied: 0.05Ti0.95Ta, 0.15Ti0.85Ta, 0.85Ti0.15Ta and 0.95Ti0.05Ta. Photocathalisys tests were also carried out on the materials for the dyes Rhodamine B, Congo Red and Methyl Orange. It was observed that Ti/Ta materials showed a lower Band Gap than pure Tantalum, and better photocatalysis results, since the presence of Tantalum hinders the transition from rutile phase of Titanium to Anatase and the rutile phase shows better photocatalysis activities. The 0,85TI0,15Ta 900oC/4h material showed the best photocatalysts results, indicating that when mixed with tantalum, the photocatalytic activity of titanium can be improved. Our results suggest that the mixture of Tantalum and Titanium can improve the photocatalysts activity to the pure metals.

Good structure, but long background+gap. Perhaps decrease experimental details, and concentrate on results.

4. Abstract (Chat-GPT)

Inadequate disposal of effluents containing a high concentration of organic dyes, recalcitrant substances, and processing additives has severely disrupted aquatic and environmental ecosystems. Standard industrial effluent treatments primarily employ biological methods utilizing activated sludge and physical-chemical processes involving precipitation-coagulation or adsorption. However, numerous chemical structures, particularly those of dyes, exhibit resistance to microbial degradation, complicating contaminant removal. Heterogeneous photocatalysis has emerged as a crucial approach to catalyze organic dye molecules, necessitating the continuous quest for novel photocatalysts with superior catalytic capabilities. This study focuses on synthesizing Ti/Ta alloys via the Pechini chemical route, a pioneering effort aimed at enhancing Titanium's catalytic efficacy. The process involves meticulous preparation and heating of citrates of Titanium and tantalum at 80°C, with the addition of ethylene glycol to induce polymerization. The resulting solution is heated to 110°C, leading to reduction and resin formation. Calcination at 900°C for 4 hours yields the material in powder form. Various compositions of Ti/Ta alloys were produced by varying the mass proportion of each component (e.g., 0.05Ti0.95Ta, 0.15Ti0.85Ta). Photocatalysis tests were conducted, focusing on dyes like Rhodamine B, Congo Red, and Methyl Orange. Remarkably, Ti/Ta materials exhibited a narrower Band Gap compared to pure Tantalum, indicating superior photocatalytic performance. Notably, the 0.85Ti0.15Ta composition demonstrated the most promising photocatalytic results, suggesting that the incorporation of tantalum into titanium enhances its photocatalytic activity.

It helped in correcting typos

Structural and functional characterization of three key enzymes in the biosynthesis of vitamin c from Myrciaria dubia

Myrciaria dubia (Kunth) McVaugh, known as “camu-camu” or “aracá d’agua”, is a fruit native to the Amazon, characterized by its high content of L-Ascorbic Acid (Vitamin C or AsA). Due to this property, the enzymes that participate in the biosynthesis of AsA could have potential biotechnological applications for the artificial production of AsA. However, the structural biology of the enzymes involved has been poorly explored. Here, we describe the biophysical, functional, and structural properties for three enzymes of the D-mannose/L-galactose pathway (Smirnoff & Wheeler). The enzymes are purified by affinity chromatography and molecular exclusion. GDP-D-mannose-3 ́,5 ́-epimerase (MdGME), which catalyzes a double epimerization of GDP-mannose to produce GDP-L-galactose and GDP-L-gulose, proved to be a dimer in solution and its crystallographic structure was solved, in both its apo (2.5 Å, bound to NAD+) and holo (1.25 Å bound to NAD+/substrate/product) forms. L-galactose dehydrogenase (MdGDH) and L-galactono-1,4-lactone dehydrogenase (MdGalDH) proved to be monomeric in solution. MdGDH showed a catalytic activity with a Km of 0.128 mM and an optimal pH of 7. We show that inhibition by AsA in MdGDH is due to pH changes and is not necessarily due to a competitive inhibition at its active site as reported for the homologous enzyme of spinafre (SoGDH). The crystallographic structure of SoGDH was solved at 1.4 and 1.75Å in its apo and holo (NAD+-bound) forms, respectively. Finally, MdGalDH showed a catalytic activity with a Km of 0.044 mM and an optimal pH of 8 and was inhibited by its own substrate. The crystallographic structure was solved to 2.1 Å. The present work contributed to a broader understanding of the structure-function relationships of enzymes involved in the synthesis of vitamin C.

Abstract correction with ChatGPT:

Myrciaria dubia (Kunth) McVaugh, known as 'camu-camu' or 'aracá d’agua,' is a fruit native to the Amazon. It is characterized by its high content of L-Ascorbic Acid (Vitamin C or AsA). Due to this property, the enzymes that participate in the biosynthesis of AsA could have potential biotechnological applications for the artificial production of AsA. However, the structural biology of the enzymes involved has been poorly explored. In this study, we describe the biophysical, functional, and structural properties of three enzymes from the D-mannose/L-galactose pathway (Smirnoff & Wheeler). The enzymes were purified using affinity chromatography and molecular exclusion. GDP-D-mannose-3',5'-epimerase (MdGME), which catalyzes a double epimerization of GDP-mannose to produce GDP-L-galactose and GDP-L-gulose, was found to exist as a dimer in solution. Its crystallographic structure was solved in both its apo form (2.5 Å, bound to NAD+) and holo form (1.25 Å, bound to NAD+/substrate/product). L-galactose dehydrogenase (MdGDH) and L-galactono-1,4-lactone dehydrogenase (MdGalDH) were found to be monomeric in solution. MdGDH exhibited catalytic activity with a Km of 0.128 mM and an optimal pH of 7. We demonstrate that the inhibition by AsA in MdGDH is due to pH changes and is not necessarily a result of competitive inhibition at its active site, as reported for the homologous enzyme in spinach (SoGDH). The crystallographic structure of SoGDH was solved at 1.4 and 1.75 Å in its apo and holo (NAD+-bound) forms, respectively. Lastly, MdGalDH displayed catalytic activity with a Km of 0.044 mM and an optimal pH of 8. It was inhibited by its own substrate. The crystallographic structure of MdGalDH was solved to 2.1 Å. This study contributes to a broader understanding of the structure-function relationships of enzymes involved in the synthesis of vitamin C.

Not much improvement, as the text was already good

**Quercetin enhances the antihypertensive effect of oral nitrite and increases the formation of nitrosothiols in spontaneously hypertensive rats by promoting gastric nitric oxide production**

**Abstract:** Hypertension is a cardiovascular disease that is associated with endothelial dysfunction and consequently, reduction in nitric oxide (NO) production. Several drugs have been studied to increase the bioavailability of NO and reduced the blood pressure (BP), including the oral treatment with inorganic nitrite. Nitrite is converted into NO in the acidic environment of the stomach through a reduction mechanism. Reducing agents may favor this mechanism by donating electrons for the reaction. Some polyphenols, such as quercetin, have reducing properties, due to their antioxidant activity. However, there are no surveys which investigated the effects of the association of nitrite and quercetin on the gastric formation of NO and storage of its derivatives. We hypothesized that the oral treatment with the antioxidant quercetin (10 mg/kg) enhances the gastric conversion of nitrite to NO, metabolites formation, and anti-hypertensive action. To address this, we examined the impact of this association with different concentrations of nitrite (1, 5, 15 mg/kg), after 1h, 24h, and for 7 days of treatment, on the blood pressure of spontaneously hypertensive rats (SHR) male, aged 10 weeks, and control animals Wistar, using the technique of plethysmography. Furthermore, we analyzed the concentrations of nitrite, nitrate, and nitrosothiols in the plasma, muscle, heart, liver, aorta, perivascular tissue, brain, lungs, and epididymal fat using the chemiluminescence-based ozone method. Additionally, we evaluated NO production in the stomach. The results showed that the association enhanced the chronic and acute anti-hypertensive effect of nitrite, in a nitrite dose-dependent manner, as well as the formation of gastric NO and increased the levels of all the metabolites of NO analyzed in the plasma and in all tissues, except in the brain, the lungs and the epididymal fat. Together, these data highlight quercetin's role in promoting the formation of gastric NO from sodium nitrite and its biological effects.

Excellent structure, but long background

Abstract

Written by me

Duplex treatments are used to enhance the performance of tribological behavior of materials. The combination of diamond-like carbon (DLC) films with nitrocarburized compound layers has gained a lot of interest due to the wear resistance properties obtained by this treatment. However, previous studies show that conventional diamond-like carbon films may collapse under high temperatures and aggressive conditions of wear. In this report, we present the behavior of DLC films doped with nitrogen and silicon with nitrocarburized compound layers on the wear resistance of the AISI M2 steel. Films and layers were deposited using a pulsed-dc power supply with PECVD and plasma nitrocarburizing techniques. We have deposited the conventional DLC, nitrogen-doped DLC (N-DLC) and silicon-doped DLC (Si-DLC), and its respectives combinations with nitrocarburizing treatments. Coatings were studied using metallography, Raman and FTIR spectroscopy, microhardness vickers and VDI 3189 adhesion test. Tribological properties were evaluated by the fixed-ball wear test technique. Results revealed that doping of the film with nitrogen has reduced the thickness and the amount of sp3 hybridizations of the film while silicon doping also reduced the thickness but increased the amount of sp3 hybridizations of the film, when compared to the conventional DLC film. FTIR spectroscopy has shown different nitrogen and silicon bonding for doped films which did not appear on conventional DLC. Adhesion tests proved that duplex coatings increase the adhesion of the DLC film on the substrate. The tribological tests indicated that Si-DLC with nitorcarburized compound layer has increased the wear resistance of the material the most when compared to other treatments. Application of this study may lead to further research on developing new coatings to increase the useful life of machining tools, since this work aimed on developing and studying coatings on AISI M2 steel.

Good structure. No need to specify methods, without showing results

Re-written by ChatGPT

Duplex treatments are employed to enhance the tribological performance of materials. The combination of diamond-like carbon (DLC) films with nitrocarburized compound layers has garnered significant attention owing to its remarkable wear-resistant properties. However, prior research has indicated that conventional diamond-like carbon films may undergo degradation under elevated temperatures and harsh wear conditions. In this study, we investigate the impact of nitrogen and silicon-doped DLC films, in conjunction with nitrocarburized compound layers, on the wear resistance of AISI M2 steel. The deposition of these films and layers was achieved using a pulsed-dc power supply in combination with plasma-enhanced chemical vapor deposition (PECVD) and plasma nitrocarburizing techniques. Specifically, we deposited conventional DLC, nitrogen-doped DLC (N-DLC), and silicon-doped DLC (Si-DLC) coatings, and its respectives combinations with nitrocarburizing treatments. The characterization of these coatings involved metallography, Raman and Fourier-transform infrared (FTIR) spectroscopy, microhardness Vickers testing, and VDI 3189 adhesion testing. The evaluation of tribological properties was conducted using the fixed-ball wear test technique. Our results demonstrate that nitrogen doping reduced the film thickness and the prevalence of sp3 hybridizations, while silicon doping decreased the thickness but increased the sp3 hybridization in comparison to conventional DLC films. FTIR spectroscopy revealed distinct nitrogen and silicon bonding in the doped films, which was absent in conventional DLC. Adhesion tests confirmed that duplex coatings enhance the DLC film's adhesion to the substrate. Furthermore, tribological assessments revealed that Si-DLC combined with nitrocarburized compound layers exhibited the highest wear resistance among the treatments. The application of this research may foster further investigations into developing novel coatings for the prolongation of machining tool lifespans, particularly as this study focused on the development and analysis of coatings applied to AISI M2 steel.

Not much improvement

**Abstract**

Glued laminated wood (Glulam) has been widely used in structural applications due to its high strength and versatility. Knowing the mechanical behavior of Glulam under repeated forces, a topic that constitutes a gap in the area of knowledge in which it operates, is of paramount importance to guarantee the durability and long-term performance of wooden structures. This study aims to evaluate the influence of cyclic forces on the stiffness of the Glulam when the structural elements are subjected to bending, the most frequent structural situation among the usual applications of the referred product. Experimental investigations were conducted with two tropical wood species, namely Marupá (*Simarouba amara*) and Pequiá (*Caryocar villosum*), and an adhesive, Cascophen RS-216-M (CASCO ®, Hexion) one of those usually used by industry in sector. The values of modulus of elasticity in bending (E), obtained before the cyclic application of forces, were used as a reference for the construction of the graph of the modulus of elasticity by the number of cycles [E × Nc]. The following cycle numbers were adopted: 0, 10, 100, 1,000, 86,400, 172,800, 345,600, 691,200, for frequencies of 1Hz and 2Hz. The results indicate that application repeated application of forces does not significantly affect the stiffness of Glulam parts. The woods selected for this research are within the apparent density range established by the normative document NBR7190/2022-1: - Design Criteria. As the number of cycles and frequency increases, the specimens exhibit stiffness close to each other. In the dispersion chart from Marupá for a frequency of 1 Hz and 2 Hz, R² values were 2.08 and 24.67% respectively, in from Pequiá for a frequency of 1 Hz and 2 Hz, R² values were 38.86 and 11.95% respectively, shows that the results do not present linear dependence between the variables. As there was no apparent damage in tested specimens, it was convenient to evaluate the occurrence of damage on the glue line, depending on the number of cycles, an aspect that was also not identified. Thus, the studied woods are suitable for manufacturing Glulam.

Good structure. Perhaps less experimental details and more results

**Abstract reviewed with ChatGPT**

Glued laminated wood (Glulam) has gained widespread use in structural applications due to its remarkable strength and versatility. However, understanding how Glulam behaves mechanically when subjected to repetitive forces, an aspect that remains relatively unexplored in the field, holds paramount significance for ensuring the longevity and sustained performance of wooden structures. This study focuses on assessing the impact of cyclic forces on Glulam stiffness, particularly in scenarios involving bending, which represents the most common structural condition for this product. Experimental investigations were carried out using two tropical wood species, Marupá (Simarouba amara) and Pequiá (Caryocar villosum), along with the adhesive Cascophen RS-216-M (CASCO®, Hexion), a commonly used adhesive in the industry. The initial values of modulus of elasticity in bending (E), measured before subjecting the specimens to cyclic forces, served as a reference for constructing the modulus of elasticity versus the number of cycles [E × Nc] graph. Various cycle numbers were employed, including 0, 10, 100, 1,000, 86,400, 172,800, 345,600, and 691,200, at frequencies of 1Hz and 2Hz. The findings reveal that repeated application of forces has a negligible impact on Glulam stiffness. The selected wood species in this study fall within the apparent density range specified in the normative document NBR7190/2022-1: - Design Criteria. Furthermore, as the number of cycles and frequency increase, the specimens exhibit stiffness levels that remain closely aligned. Notably, the results demonstrate that there is no linear dependence between the variables, as evidenced by the dispersion chart for Marupá and Pequiá at different frequencies. Remarkably, no apparent damage was observed in the tested specimens, prompting an examination of potential damage to the glue line based on the number of cycles, which was also not detected. Consequently, this study affirms that the studied wood species are well-suited for the production of Glulam components.

Not much improvement

ABSTRACT:

Foodborne diseases (FBDs) are the cause of part of the mortality in developing countries, with bacteria responsible for this pathology. Many FBDs are caused by Staphylococcus aureus. This bacterium can live in two ways, having its planktonic or sessile form – with the formation of persistent and resistant biofilms. Although antimicrobials already exist, the use of natural antimicrobials that are less harmful to the environment is a trend in the industry, therefore, rhamnolipids (RL) have demonstrated potential in controlling food pathogens. In this study, the behavior of RL against S. aureus cells at different pH and ionic strength was explored to obtain new methods of combating and removing bacterial biofilms. The determination of RL activity in S. aureus biofilms was carried out based on previous MIC and CBM results. For the treatments tested, the initial 10% NaCl solution was diluted for each medium, at concentrations of 1%, 2%, 5%, and 7.5%. The salt concentrations had pHs adjusted to 5, 6, 7, and 8. For the growth of biofilms, polystyrene coupons with a surface area of 1 cm² were used, which, after 24 hours, were washed and added to the treatments. Quantification was done using confocal microscopy. The results obtained (which?) show that RL activity depends on pH and ionic strength, proving the hypotheses. The presence of salt allowed the activity to be increased in neutral and alkaline pH. Furthermore, despite the biofilms being more resistant, the removal was effective and cell viability was reduced. The results suggest that RL has the potential to control S. aureus.

Excellent structure. Could do with less experimental details, and more results

ABSTRACT CORRIGIDO PELO CHAT GPT:

Foodborne diseases (FBDs) contribute significantly to mortality rates in developing countries, with bacteria being a primary causative agent. *Staphylococcus aureus* is a prominent bacterium responsible for several FBDs. This bacterium exists in two forms: planktonic and sessile, forming persistent and resistant biofilms. While antimicrobial agents are available, the industry is increasingly shifting towards the use of environmentally friendly natural antimicrobials. Rhamnolipids (RL) have shown promise in combating foodborne pathogens. This study explores the efficacy of RL against *S. aureus* cells under varying pH levels and ionic strengths to develop novel methods for biofilm and removal. RL activity in S. aureus biofilms was determined based on previously established Minimum Inhibitory Concentration (MIC) and Critical Biofilm Concentration (CBM) values. The treatments involved dilution of an initial 10% NaCl solution to achieve concentrations of 1%, 2%, 5%, and 7.5% in each medium. The pH levels were adjusted to 5, 6, 7, and 8. Biofilm growth was facilitated using 1 cm² polystyrene coupons, which were subsequently subjected to the treatments after 24 hours. Quantification was performed through confocal microscopy. The results demonstrate that RL activity is pH and ionic strength-dependent, confirming our hypotheses. The presence of salt enhanced RL activity, particularly at neutral and alkaline pH levels. Despite the biofilms' increased resistance, effective removal was achieved, leading to a reduction in cell viability. These findings suggest the potential of RL in controlling S. aureus and offer valuable insights into its application in foodborne disease prevention.

Not much improvement

Since its first assembly in 1970, the optical tweezers OT have been a great tool, for unveiling the science of the microscopy. The area of application includes biophysics, the trap of atoms, nanotechnology our nano science , microfluid, and for last the ability to manipulate very tiny objects in situations that can not be possible with other technics. For that reason, the pursuit of understanding the physics of the OT and its functionality was and still is a great area of research. Recently, a new interest in resolving the Mie Theory for non-spherical objects occurred. The reason arises from the opt, OT, issue, which is the necessity to calculate the distortion and deformation and the effect that it has on the optical bean. Because the deformation of particles by the optical ray can inflict damage on them. Moreover, knowing the exact simulation for the force can help unveil, the function of many intercellular properties of the study cell. Therefore, in this study, I will review the principle work in the model in literature for the Mie coefficient and Mie theory for non-spherical objects, in addition, to explaining the concepts. Moreover, I will relate this theory to optical tweezers OT, and the main difficulty of the deformation of an object. The result of this research shows that despite the great progress in formulating a model still is a great unknown to be discovered, more specifically in the use of machine learning for computational calculation of OT force. In the conclusion comment on the result and prospects for future research utilizing new developments in mathematics and machine learning applications on the problem.

Good structure, but long background. Problems in the text (English). Is this a review paper?

Revision of my article by chatCPT.

Recent developments have ignited a fresh interest in elucidating the Mie Theory's applicability to non-spherical objects, prompted by the specific challenges encountered in optical tweezing. These challenges revolve around the imperative to accurately compute the distortion and deformation of objects under the influence of optical forces, as any misalignment in this regard can result in detrimental effects on the targeted particles. Furthermore, a precise simulation of these forces holds the potential to unveil intricate intercellular properties within the realm of cellular studies. In light of this, the primary aim of this study is to conduct an exhaustive review of the fundamental literature encompassing the Mie coefficient and Mie theory as they pertain to non-spherical objects. Additionally, this study seeks to expound upon these concepts and draw explicit connections to the application of optical tweezers (OT), particularly in addressing the formidable challenge of object deformation. The outcomes of this research endeavor highlight an intriguing paradox: despite substantial progress in formulating theoretical models, a considerable realm of the unknown continues to beckon exploration. This uncharted territory is especially pronounced in the utilization of machine learning methodologies for the computational calculation of OT forces, hinting at the vast potential for groundbreaking discoveries that lie ahead. In conclusion, the findings of this study not only underscore the complexity of the optical tweezing phenomenon but also emphasize the pressing need for future research. As the field of mathematics and machine learning continues to evolve, there is a promising avenue for harnessing these advancements to tackle the intricate challenges associated with optical tweezers, potentially revolutionizing our understanding and applications of this transformative technology."

The text improved, but it is verbose

**Chemical, thermal, and spectroscopy characterization of kaolin industrial residues from Vitória do Jari, Amapá, Brazil**

Kaolin, or China clay, is a fine particle size clay mineral commonly used as pigment base or coating material for the paper industry. This material has long been explored in the Morro do Felipe Mine, Vitória do Jari municipality, Amapá State Brazil, which is currently administered by Kamin-Cadam company. However, the mining and processing continually generates residue, which is released in nature. Here we present a chemical and structural study which aims to propose an application for this kaolin residue. XRF was performed to assess elementary composition, powder XRD and FT-IR were applied to investigate the crystalline phases present. DSC and TGA analyses were performed to investigate thermal properties. XRF indicated Si and Al as the main elements present, which is predictable for clay minerals, and also a significant amount of Fe and Ti, which constitute the main impurity elements. Rietveld refinement performed on the Powder XRD data (Rwp=5,01%) showed disordered kaolinite as the main phase (64,91%), but some peaks corresponding to hematite (17,56%), anatase (10,31%) and quartz (7,22%) were also observed. FT-IR, DSC and TGA curves were similar to those from literature for kaolinite. In DSC it is possible to identify an event corresponding to a dehydroxylation with onset near 350oC, that is confirmed by a 10% mass loss observed between 400oC and 600oC. From these compositional results it is inferable that the kaolin residue can be applied to CO2 catalysis, according to what has been indicated in previous studies. Therefore, we have demonstrated the potential application of the kaolin residue from Morro do Felipe mine in CO2 decomposition, what has an important role in carbon fixation and greenhouse effect control.

Good structure. No need to specify methods; only give the results

**Abstract – Revised by ChatGPT**

Kaolin, commonly known as China clay, is a finely grained clay mineral frequently employed as a pigment base or coating material in the paper industry. The Morro do Felipe Mine, situated in the Vitória do Jari municipality of Amapá State, Brazil, has a long history of kaolin exploration and is presently under the administration of the Kamin-Cadam company. However, the mining and processing activities at this site result in the continual generation of residue, which is released into the environment. In this study, we present a comprehensive chemical and structural analysis with the aim of proposing a practical application for this kaolin residue. Elemental composition analysis using X-ray fluorescence (XRF) revealed silicon (Si) and aluminum (Al) as the predominant elements, which aligns with expectations for clay minerals. Additionally, a substantial presence of iron (Fe) and titanium (Ti) was observed, representing the primary impurity elements. Powder X-ray diffraction (XRD) data subjected to Rietveld refinement (Rwp=5.01%) identified disordered kaolinite as the primary phase (64.91%), while peaks corresponding to hematite (17.56%), anatase (10.31%), and quartz (7.22%) were also evident. Fourier-transform infrared spectroscopy (FT-IR), differential scanning calorimetry (DSC), and thermogravimetric analysis (TGA) confirmed the similarity of the kaolin residue to known properties of kaolinite. Notably, a distinctive event in the DSC analysis, marked by dehydroxylation with an onset temperature near 350°C, was corroborated by a 10% mass loss observed between 400°C and 600°C. Based on these compositional findings, it is plausible to propose the utilization of the kaolin residue in CO2 catalysis, as indicated in previous studies. Consequently, our research demonstrates the potential application of the Morro do Felipe mine's kaolin residue in CO2 decomposition—a critical process contributing to carbon fixation and greenhouse gas control efforts. This study underscores the promising environmental and industrial implications of repurposing kaolin residue, emphasizing its role in addressing carbon emissions and mitigating the greenhouse effect.

Not much improvement

**Generative Artificial Intelligence tools as a support to ideation in the innovation process**

**Abstract**

**Context** The recent launches of accessible Generative AI tools turned the use in organizational context as part of the innovation process became more frequent. **GAP** However, the process on how to better take advantage of the tools to improve efficiency and quality on the results is not properly inserted in existing innovation processes. **Purpose** This article aims to provide evidence on how generative AI tools can be used to improve results in the ideation phase of the front end of innovation. **Method** Based on an exploratory research and case studies of companies with incremental and radical innovation processes in place, the main potential uses were identified. **Results** It was observed that, when human and artificial intelligence are combined, more creative responses are generated in the ideation process, due to generation of ideas by the AI and fostering creative process by humans through inspiration. **Conclusions** Those findings open space for new approaches in innovation management using hybrid intelligence.

Excellent structure. Need more results.

**Corrected by Chat GPT**

Title Suggestion: "Enhancing Ideation in Innovation Management: Leveraging Generative AI Tools for Hybrid Intelligence"

**Abstract:**

**Context:** The increasing accessibility of Generative AI tools has ushered in a new era of organizational innovation. **Gap** However, their integration into existing innovation processes remains an underexplored area. **Purpose** This article presents empirical evidence on harnessing generative AI tools to enhance ideation in the front-end of innovation. **Method** Employing exploratory research and case studies of companies engaged in both incremental and radical innovation, this study identifies key applications of these tools. **Results** The results indicate that combining human and artificial intelligence leads to more creative ideation, with AI generating ideas and humans catalyzing the creative process through inspiration. **Conclusions** These findings pave the way for innovative approaches to managing hybrid intelligence in the realm of innovation.

Text improved

ABSTRACT: Ultra-High-Performance Concrete (UHPC) can achieve excellent durability and high strength because its dense microstructure. However, its reduced porosity makes it difficult releasing internal pressures caused by water evaporation when this material is subjected to high temperatures. Because of this, fire situation can seriously damage UHPC structural elements, especially in comparison to conventional concrete. This paper presents thermomechanical numerical simulations with reinforced concrete beams to understand the behavior of concrete, especially UHPC, under high temperatures, using the finite element software ABAQUS. The thermomechanical properties of UHPC and normal strength concrete (NSC) were validated from experimental tests available in the literature, employing sequentially coupled thermal-stress analysis. To compare the two materials, beams with the same resistance capacity were dimensioned, and then were modeled with two loading steps: application of mechanical loads and heating according to the ISO 834 fire curve. Parametric analyzes were also carried out to evaluate the impact of strength, reinforcement cover, and loading rate on UHPC beams. Initially, it was observed that the UHPC heats up much faster than the CRN, reaching about 182 °C more in the center of the beam after 180 minutes. Higher thermal conductivity associated with higher degradation of mechanical properties showed that UHPC beams suffered greater displacements and achieved shorter resistance times. Under the aspect of geometric equivalence, the CRN beam resisted for almost 40 minutes longer. From the parametric analyses, little influence of the resistance was observed, a median influence of cover, and a great influence of the loading rate. Since the results indicated lower fire resistance for the UHPC elements, fire safety design considerations must cover the type of concrete used so that appropriate parameters can be defined for occupant escape and flames extinguishing.

Excellent structure. Some problems with the text.

REVIEWED ABSTRACT

Ultra-High-Performance Concrete (UHPC) is known for its remarkable durability and strength, owing to its dense microstructure. However, its reduced porosity poses challenges when exposed to high temperatures, making it vulnerable to fire damage compared to conventional concrete. This paper presents thermomechanical numerical simulations of reinforced concrete beams, focusing on understanding the behavior of UHPC and conventional concrete under elevated temperatures. We employed the finite element software ABAQUS and validated thermomechanical properties through experimental tests. Beams with equivalent resistance were modeled, subjected to mechanical loads, and heated following the ISO 834 fire curve. Parametric analyses were conducted to assess the impact of strength, reinforcement cover, and loading rate on UHPC beams. Our findings reveal that UHPC heats up significantly faster than conventional concrete, experiencing a temperature difference of approximately 182°C at the center of the beam after 180 minutes. The higher thermal conductivity and degradation of mechanical properties in UHPC resulted in greater displacements and shorter resistance times, with conventional concrete beams showing superior fire resistance. Parametric analyses demonstrated minimal influence of resistance, moderate effects of cover, and substantial sensitivity to loading rate. These results emphasize the importance of considering concrete type in fire safety design, allowing for the definition of appropriate parameters for occupant safety and fire suppression. This study contributes to a deeper understanding of UHPC's behavior in high-temperature environments, with potential implications for structural design and fire safety protocols.

Text improved

Multifunctional nanocarriers for lung cancer application

Abstract

Lung cancer is the leading cause of death related to cancer, and is normally diagnosed in late stages. The use of nanoparticles as theranostics agents for the detection and treatment of diseases offer many advantages. However, there are several barriers that decreases the efficiency of the nanomaterials. Natural cell membrane coating is a recent and promising strategy to overcome these barriers, combined with gold nanorods (AuNR), effective agents in photothermal therapy. Doxorubicin (DOX) is a chemotherapy applied in the treatment of different cancers, but it is also known by its cardiotoxicity. In this work, we developed gold nanorods and doxorubicin coated with natural lung cancer cell membrane to increase the targeted delivery of the drug and use the potential local heating, and consequentially, the death of the cancer cell. The A549 membrane were extracted and then submitted to mechanical extrusion with the gold nanorods (PEG coated) and doxorubicin. The efficacy of the formulation CM-DOX-AuNR was determined by dynamic light scattering, which presented a size of 100 nm, a polydisperse index of 0,605 and a positive zeta potential of 2.6 mV. By the properties observed, the coating of the doxorubicin and the gold nanorods was successful and the formulation had the expected size. For complete analysis, the nanoparticles will be characterized by imaging microscopy, and in vitro tests will be performed with health and cancerous lung cells.

Excellent structure, but long background+gap

Corrigido pelo chat GPT

Lung cancer stands as the foremost cause of cancer-related deaths, often diagnosed in advanced stages. The utilization of nanoparticles as theranostic agents for disease detection and treatment offers numerous advantages. However, several barriers reduce the efficiency of nanomaterials. A recent and promising strategy to overcome these barriers involves natural cell membrane coating, combined with gold nanorods (AuNR), known for their effectiveness in photothermal therapy. Doxorubicin (DOX) is a chemotherapy used in treating various cancers but is also known for its cardiotoxicity. In this study, we developed gold nanorods and coated them with natural lung cancer cell membrane to enhance targeted drug delivery and utilize localized heating, ultimately leading to cancer cell death. The A549 cell membranes were extracted and then subjected to mechanical extrusion with the gold nanorods (PEG-coated) and doxorubicin. The efficacy of the CM-DOX-AuNR formulation was determined using dynamic light scattering, which revealed a size of 100 nm, a polydisperse index of 0.605, and a positive zeta potential of 2.6 mV. These properties demonstrate the successful coating of doxorubicin and gold nanorods, achieving the expected size. For a comprehensive analysis, nanoparticles will undergo characterization via imaging microscopy, and in vitro tests will be conducted using both healthy and cancerous lung cells.

Not much improvement

**Abstract original:**

Polyethylene glycol (PEG) is an extensively used polymer for coating of iron oxide nanoparticles, due to its ability to improve stability, increase blood circulation time and its non-toxicity. It can be purchased in different molarities and the amount used for coating varies a lot among authors that have shown relevance of these parameters in the coating output. However, there are several synthesis protocols for production of iron oxide nanoparticles that result in particles that differ in size, stability, magnetization and other properties. In this paper, a previous characterized IONP was reproduced in order to verify its reproducibility and known properties, aiming for posterior use in Magneto Motive Ultrasound (MMUS) technique for localization and estimation of viscoelastic parameters of tissue, mainly cancerous tissue. For this purpose, the synthesis was made by coprecipitation and coated with 5ml PEG-average mol. wt. 3350 Da (20mg/ml), purchased from Sigma. Following, this nanoparticle was characterized with dynamic light scattering and zeta potential measurements, to analyze its hydrodynamic size, aggregation and stability. Then, it was inserted in a gelatin phantom inclusion for application of MMUS and displacement measures. The characterization showed hydrodynamic sizes between 50 and 100nm and zeta potential around 40mV, which is considered suitable for MMUS applications. However, this synthesis also demonstrated significant challenges in reproducibility and maximum displacement of 5μm for a magnetic field frequency of 50Hz, which is considered low for the high concentrations of 4% of nanoparticles used. Therefore, future goals in this project involve trying different synthesis protocols, different PEG molarities and optimization of displacement measurement process, considering the goal of in vivo tests intended.

Excellent structure, but background good be shorter. Some problems with the text.

**Abstract melhorado com o Chat GPT:**

Polyethylene glycol (PEG) is a widely employed polymer for coating iron oxide nanoparticles (IONPs) due to its capacity to enhance stability, prolong blood circulation, and its inherent non-toxic properties. Variations in PEG molarity and coating quantity have been observed among different researchers, underscoring the significance of these parameters in nanoparticle coating. However, diverse synthesis protocols for producing IONPs yield particles with varying sizes, stability, magnetization, and other critical attributes. In this study, we sought to reproduce previously characterized IONPs to assess their reproducibility and established characteristics. Our primary objective is to prepare these nanoparticles for potential utilization in Magneto Motive Ultrasound (MMUS) techniques, specifically for the localization and estimation of viscoelastic parameters in tissues, particularly cancerous tissue. The IONPs were synthesized using a coprecipitation method and subsequently coated with 5 ml of PEG with an average molecular weight of 3350 Da (at a concentration of 20 mg/ml), sourced from Sigma. Subsequently, we conducted a comprehensive characterization of the coated nanoparticles using dynamic light scattering and zeta potential measurements. These analyses allowed us to determine key properties, including hydrodynamic size, aggregation tendencies, and stability. Our findings revealed hydrodynamic sizes within the range of 50 to 100 nm, accompanied by a zeta potential of approximately 40 mV. These results indicate that the nanoparticles are well-suited for MMUS applications. However, the synthesis process presented notable challenges concerning reproducibility. Furthermore, the maximum displacement recorded was 5 μm, achieved at a magnetic field frequency of 50 Hz. Given the relatively high nanoparticle concentration of 4%, this displacement value is considered suboptimal. As a result, our future research endeavors will focus on exploring alternative synthesis protocols, varying PEG molarities, and optimizing the displacement measurement methodology. These efforts are crucial as we move towards in vivo testing and seek to enhance the performance and reliability of our IONPs for MMUS applications. Text improved

**Abstract**

Measuring and controlling moisture content is a central challenge in cotton ginning. Low moisture content reduces profitability, with higher machine wear and lower fiber quality. On the other hand, if the moisture content is too high, it is harder to clean and separate the lint from the seed. It has been determined that there is a relationship between the force exerted by the hydraulic press together with the density and the overall moisture content of the bale. However, this method only considers the condition of the cotton bale at the end of the compression cycle, motivating the use of new methods and instruments to analyze bales through all the process. In this paper, we propose discovering a governing equation from data of pressure and height of the bale to estimate the moisture content based on the Sparse Identification of Nonlinear Dynamics (SINDy) method. To generate the required dataset, experiments were conducted in a hydraulic press to manufacture reduced-scale cotton bales following commercial standards. In particular, we use a data log system to save pressure transducers and a laser sensor data through all the process. After being weighed, the cotton moisture content is determined by the oven drying moisture measurement method. Then, we analyze the data to identify the system dynamics. This results in an equation that relates the pressure of the hydraulic press, the areas of the hydraulic cylinder, the area of the bale chamber, the height and the mass of the cotton bale to estimate the moisture content of the cotton bale. The identification of the dynamics of the cotton bale provides a promising new approach to quickly and inexpensively estimate the moisture content of cotton bales.

Excellent structure, but background is too long

**Abstract ChatGPT**

"In the realm of cotton ginning, the precise measurement and management of moisture content stand as paramount challenges. Low moisture content not only diminishes profitability but also accelerates machine wear while compromising fiber quality. Conversely, excessive moisture content poses difficulties in the efficient cleaning and separation of lint from seeds. Although a connection between hydraulic press force, density, and overall moisture content in cotton bales has been established, the existing method exclusively assesses the bale's condition post-compression cycle, prompting the quest for innovative methodologies and instrumentation to comprehensively scrutinize bale dynamics throughout the entire process. In this study, we propose a novel approach rooted in the Sparse Identification of Nonlinear Dynamics (SINDy) method. Our objective is to unveil a governing equation for moisture content estimation based on data derived from bale pressure and height measurements. To acquire the requisite dataset, we conducted experiments within a hydraulic press, strictly adhering to industry standards for the production of scaled-down cotton bales. Notably, we employed a data logging system to meticulously record pressure transducer and laser sensor data throughout the entire process. Following the weighing of cotton bales, moisture content was assessed via the oven-drying moisture measurement method. Subsequent data analysis led to the development of an equation linking hydraulic press pressure, hydraulic cylinder and bale chamber areas, bale height, and mass, thereby offering a robust means to estimate cotton bale moisture content. This innovative approach not only promises rapid and cost-effective moisture estimation but also holds substantial potential for advancing the cotton ginning industry."

Text improved. Verbose, though

**Abstract:**

Hepatocellular carcinoma (HCC) is considered one of the most frequent malignancies worldwide. Therefore, in recent years, new lines of research have been developed focused on surgical and non-surgical treatments for this clinical problem. However, most of these treatments have limitations, being very invasive, affecting the health of the patient. From this perspective, a need arises to develop new biomaterials for the controlled administration of drugs, capable of presenting characteristics such as biocompatibility, biodegradability, encapsulation capacity and specificity to cancerous tissue. The following research (this?) proposes the synthesis, and characterization of nanoparticles based on the biopolymers chitosan and alginate loaded with curcumin for the inhibition of HCC. Chitosan/alginate nanoparticles (NPs) were formulated to encapsulate curcumin (Cur) for oral delivery and examined its inhibitory effect on diethylnitrosamine (DEN)-induced HCC in mice. Cur-loaded NPs (Cur-NPs) were prepared by o/w emulsification and ionotropic gelation. The optimization of Cur-NPs was successfully performed by response surface methodology. The optimal Cur-NPs could be prepared by chitosan/alginate mass ratio of 0.05:1, 1.5% (w/v) Pluronic-F127 and 2.5 mg/mL of Cur. The optimized nanoparticles had the particle size, zeta potential, encapsulation efficiency and loading capacity of 215 nm, −24.1mV, 85% and 27%, respectively. In addition, this system also exhibited antiangiogenic activity. In vitro release profile showed that Cur release was sustained and retarded by drug encapsulation into NPs. The overall results suggest that Cur-NPs are promising candidates for encapsulation, protection, and controlled release of Cur for HCC treatment.

**Excellent structure, but the background was too long**

**Abstract with ChatGPT:**

Hepatocellular carcinoma (HCC) currently ranks among the most prevalent malignancies worldwide. Consequently, in recent years, extensive research efforts have focused on both surgical and non-surgical treatments for this clinical challenge. Nevertheless, many of these treatment approaches possess inherent limitations, often proving highly invasive and detrimental to the patient's overall health. In light of these limitations, there is a pressing need to develop novel biomaterials capable of enabling the controlled administration of therapeutic agents. These biomaterials should exhibit key attributes such as biocompatibility, biodegradability, efficient encapsulation, and cancer-specific targeting. Herein, we synthesize and characterize nanoparticles with biopolymers chitosan and alginate, loaded with curcumin, with the aim of inhibiting HCC. Chitosan/alginate nanoparticles (NPs) were formulated to encapsulate curcumin (Cur) for oral delivery, and their inhibitory effect on diethylnitrosamine (DEN)-induced HCC in mice was thoroughly investigated. The preparation of Cur-loaded NPs (Cur-NPs) involved the use of o/w emulsification and ionotropic gelation techniques. The optimization of Cur-NPs was successfully conducted through response surface methodology. The results of the optimization process revealed that the optimal Cur-NPs formulation could be achieved using a chitosan/alginate mass ratio of 0.05:1, 1.5% (w/v) Pluronic-F127, and 2.5 mg/mL of Cur. These optimized nanoparticles exhibited favorable characteristics, including a particle size of 215 nm, a zeta potential of -24.1mV, an encapsulation efficiency of 85%, and a loading capacity of 27%. Additionally, this nanoparticle system displayed antiangiogenic activity. The in vitro release profile demonstrated sustained and controlled release of Cur due to its encapsulation within the NPs. Overall, our findings suggest that Cur-NPs hold substantial promise as candidates for encapsulation, protection, and controlled release of curcumin in the context of HCC treatment.

Text improved. Verbose, though

**ABSTRACT**

**Context -** The application of new technologies associated to the Covid-19 pandemic crisis has accelerated the digital transformation. We don't speak a day that we are not confronted with in the news, business, academic life or in our private lives. Its advancement is worldwide and rapidly in modern companies, as it improves time, costs, methods, quality and generates great opportunities.

The Covid-19 pandemic crisis has ushered in a swift and global digital transformation through the adoption of cutting-edge technologies. The omnipresence of this transformation in our daily lives, spanning news outlets, business landscapes, academic realms, and personal spheres, underscores its profound impact. This paradigm shift transcends borders and is swiftly becoming the lifeblood of contemporary enterprises, heralding enhancements in efficiency, cost-effectiveness, methodologies, quality, and the creation of unprecedented opportunities.

**Gap** **-** But there is a wide variety of different perceptions and opinions on this topic in people's minds, the current economic situation has therefore anchored the positioning of digital transformation as a lever for economic recovery and evolution and has reminded companies of the need to carry out this transformation to remain competitive.

**Purpose -** Based on the analysis of procedures and processes implemented in the sector to be defined for the development of new functionalities, other digital initiatives associated with the roadmap framework, to create a digital roadmap. (not clear who is the agent)

**Methodology -** The process will be supported by a grounded theory approach in integration with the case study method. This article offers (purpose?) an account of the stages of a research project with the objective of developing a Proof of Concept (PoC) for an Automated Roadmap generator, to help companies.

**Conclusion -** In the practical terms, this article contributes to organizations by describing the details of a user-friendly, efficient procedure for managing Digital Roadmap asset. In terms of theoretical contribution, this article addresses a visible gap in knowledge, where it addresses the question of “how” to carry out a transition to digital asset management, as opposed to the dominant discourse that focused on the question of “why” the transition.
Problems with the text: Purpose ill defined

The Covid-19 pandemic crisis has ushered in a swift and global digital transformation through the adoption of cutting-edge technologies. The omnipresence of this transformation in our daily lives, spanning news outlets, business landscapes, academic realms, and personal spheres, underscores its profound impact. This paradigm shift transcends borders and is swiftly becoming the lifeblood of contemporary enterprises, heralding enhancements in efficiency, cost-effectiveness, methodologies, quality, and the creation of unprecedented opportunities. Nevertheless, diverse perceptions and opinions abound regarding this phenomenon, and the current economic climate has cemented the digital transformation as a pivotal driver for economic resurgence and progression. It has also served as a stark reminder to businesses of the imperative to embark on this transformation journey to remain competitive. This article aims to shed light on this transformative process by scrutinizing the procedures and processes within specific sectors, elucidating the development of novel functionalities and other digital initiatives within a comprehensive roadmap framework. This research endeavor adopts a rigorous methodology, combining grounded theory with the case study method, to unravel the intricacies of crafting a digital roadmap. Furthermore, this article documents the various stages of a research project aimed at creating a Proof of Concept (PoC) for an Automated Roadmap Generator, poised to assist companies in navigating this transformative journey. In practical terms, this article contributes to organizations by providing an in-depth, user-friendly, and efficient procedure for managing their Digital Roadmap assets. On a theoretical level, it addresses a noticeable gap in knowledge, delving into the "how" of executing a transition to digital asset management, as opposed to the predominant discourse, which primarily addresses the "why" behind such a transition.

Regenerate

**Abstract**

The photocatalytic performance enhancement with single atoms has attracted attention in the last few years as the graphitic carbon nitride (g-C3N4) have become a promising photocatalyst support for water splitting due its properties of suitable light absorption and stability. However, the single atoms catalysis is a technique limited for the following reasons: 1) their stability at that scale (less than nanometer) in the sense to maintain a highly dispersion over the support material 2) The techniques of characterization for unveiling the electronic state of the single atoms during the photocatalytic process. In this article, we synthetized single atoms (Co, Ni, Au, Fe, Cu) doped g-C3N4 for assessment its performance for water splitting. The metal-doped gC3N4 is successfully prepared starting with melamine as a precursor material following of a thermal condensation process modified with the addition of chlorohydric acid. The final powder obtained after calcination (550°C) were denoted as MGCN-0, MGCN-0.1, MGCN-0.5, MGCN-1, MGCN-5, MGCN-10 related to 0, 0.1, 0.5, 1 and 10 % wt., respectively. The photocatalytic process was evaluated by the quantity of hydrogen obtain from aqueous solution containing TEOA as a sacrifice agent. A fully characterization was done for elucidate its electronic structure, bonding environment, oxidation state of the single atoms, unveiling that the metallic centers are highly stabilized for the bonds formed with the nitrogen atoms. The catalyst with 10% wt. Cu was found exhibit the best catalytic performance with the highest conversion up to 70% of light conversion. Our findings keep contributing the field of hydrogen photocatalytic production and how highly dispersed single atoms anchored suitable catalyst enhance its performance

Good structure, but background is long. Problems with the text.