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FONDAZIONE™ CARTA ETICA del Packaging

Interazione di carbonio, titanio e boro negli acciai microlegati e suo effetto sulla duttilità a caldo

Nella composizione dell'acciaio di base sono stati utilizzati contenuti variabili di carbonio, titanio e boro di 0,30% in peso di Si, 2,0% in peso di Mn, 0,006% in peso di S, 0,03% in peso di Nb e 30–35 ppm di N. I test di duttilità a caldo sono stati eseguiti con Gleeble -3800, dopo che il campione di acciaio è stato fuso in situ, solidificato e raffreddato alla temperatura di prova. L'indagine è stata completata con simulazioni termodinamiche e cinetiche. I migliori risultati sono stati ottenuti per acciai contenenti 58–100 ppm B e 35 ppm Ti. Hanno mostrato un'ottima duttilità a caldo dell'80-50% di RA nell'intervallo di temperatura compreso tra 1250 ° C e 800 °C.

alloys

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Article

Interaction of Carbon, Titanium, and Boron in Micro-Alloy Steels and Its Effect on Hot Ductility

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Abstract: Varying contents of carbon, titanium and boron were used in the base steel composition of 0.30 wt% Si, 2.0 wt% Mn, 0.006 wt% S, 0.03 wt% Nb, and 30–35 ppm N. Hot ductility tests were performed with Gleeble-3800, after the steel sample was in-situ melted, solidified, and cooled to the test temperature. Investigation was completed with thermodynamic and kinetic simulations. The best results were obtained for steels containing 58–100 ppm B and 35 ppm Ti. They showed very good hot ductility of 80–50% RA within the temperature range between 1250 °C and 800 °C. It was shown that titanium and boron were effective in improving the hot ductility. Titanium protected boron from binding into BN and was low enough to prevent excessive (Ti,Nb) carbonitride precipitation, which both could decrease hot ductility. Boron that precipitated along austenite grain boundaries as iron boride Fe_2B was very beneficial for the hot ductility of steel.

Keywords: hot ductility; boron steel; iron boride; solidification; cooling; casting

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Metodologia per la determinazione dei residui di ftalato mediante microestrazione liquido-liquido dispersivo assistita da vortice e GC-IT/MS in campioni di bevande calde mediante distributori automatici

In questo studio, è stata sviluppata una metodologia semplice, veloce ed efficace per il rilevamento e la quantificazione di sette ftalati potenzialmente rilasciati nelle bevande calde da contenitori usa e getta utilizzati nei distributori automatici. Gli autori hanno determinato le condizioni ottimali da applicare durante le varie fasi di estrazione di sette ftalati (DMP, DEP, DBP, DiBP, DEHP, DNOP e DDP) da bevande calde utilizzando una soluzione modello. La tecnica di estrazione e preconcentrazione utilizzata è stata la microestrazione liquido-liquida dispersiva assistita da ultrasuoni-vortice (UVA-DLLME) seguita da analisi gascromatografiche ottenendo recuperi dal 66,7% al 101,2% con precisione e riproducibilità rispettivamente <6,3% e <11,1%.

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Article

Methodology for Determining Phthalate Residues by Ultrasound–Vortex-Assisted Dispersive Liquid–Liquid Microextraction and GC-IT/MS in Hot Drink Samples by Vending Machines

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Abstract: In this study, a simple, fast, and effective methodology has been developed for the detection and quantification of seven phthalates potentially released in hot drinks from disposable containers used in vending machines. The authors determined the optimal conditions to be applied during the various steps of extraction of seven phthalates (DMP, DEP, DBP, DiBP, DEHP, DNOP, and DDP) from hot beverages using a model solution. The extraction and preconcentration technique used was ultrasound–vortex-assisted dispersive liquid–liquid microextraction (UVA-DLLME) followed by gas chromatographic analysis obtaining recoveries from 66.7% to 101.2% with precision and reproducibility <6.3% and <11.1%, respectively. The influence of waiting time, from the dispensing of the drink to its actual consumption, for the extraction of molecules was investigated, obtaining a temporal release profile slightly shifted towards the PAEs with higher molecular weight and vice versa for those with low molecular weight. In addition, the best instrumental parameters to be applied during the analysis of the extracts obtained were established. This optimization was carried out using GC-FID, whereas the analysis of real samples was carried out by means of GC-IT/MS for ultra-trace analysis purposes; limits of detection (LODs) ranging between 0.8 ng mL^{-1} and 15.4 ng mL^{-1} and limits of quantification (LOQs) from 1.6 ng mL^{-1} to 35.8 ng mL^{-1}, both of them lower than those found by FID, were obtained.

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La modernità dei pigmenti antichi: un approccio storico

Prima di discutere i singoli materiali in questo documento, dovremmo prima stabilire alcune definizioni di termini. A seconda del metodo di applicazione, tutti i materiali utilizzati per colorare altri oggetti sono classificati come pigmenti o coloranti. Un colorante tipico deve essere sciolto in un mezzo, solitamente acqua, in cui è immerso l′articolo da tingere. Il colorante viene apposto sull′articolo tramite un′interazione fisica o chimica. I coloranti solitamente classificati come coloranti possono anche essere usati come pigmenti, ma non possono essere applicati direttamente su superfici con normali leganti, con poche eccezioni.

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Review

The Modernity of Ancient Pigments: A Historical Approach

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Abstract: Naturally occurring and synthetic ancient pigments have a history of use spanning thousands of years. Curiously, some of their newly discovered properties make them excellent candidates for semiconductors, anticounterfeiting agents and so much more. In this paper, we will review their ancient roots in art and modern emergence as 21st century workhorses. You can never judge a pigment by its color alone!

Keywords: daguerreotyping; Egyptian blue; genetic engineering; indigo; Maya blue; medical diagnostics; Prussian blue; purple of Cassius; semiconductors; ultramarine

1. Introduction

Pigments, first processed empirically and later by a developing technology in hearth or home, gave rise to some of the most remarkable works of art ever conceived. First discovered in the cave of Altamira (Spain) in 1878 [1] and dated to the Aurignacian period (35,000 to 23,000 before present, BP), the Stone Age artists' works testify to creativity, sensitivity and a capacity for abstract thinking that forever put to rest our modern image of lumbering brutes called "cave men." After viewing some of this cave art in Lascaux (France), Pablo Picasso (1881–1973) remarked, "They've invented everything" [2]; taking his cues from "them" as his teachers, he developed his signature talent of revealing the essence of things by stripping away the unnecessary details that encumber truthful perception. A striking example of this cave art—Picasso connection is the set of rhino drawings from the Chauvet cave shown in Figure 1. The depictions of chaos, violence, movement, strength and accompanying emotions seem to signal collusion between the artists involved, although the paintings are separated from each other in time by tens of thousands of years. Furthermore, the Chauvet cave paintings were first seen by modern humans in 1994, more than 20 years after Picasso's death [3].

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Modifica dei substrati polimerici con composti funzionali biobased

I polimeri sintetici e i polimeri biodegradabili e biobased sono attualmente la più grande classe di materiali studiati e utilizzati per varie applicazioni grazie alle loro proprietà uniche e peculiari. Per i manufatti realizzati con polimeri non biodegradabili, un'efficace gestione del fine vita attraverso il riciclo meccanico e chimico è fondamentale per il loro consumo futuro, soprattutto nel caso di prodotti con vita breve che generano grandi volumi di rifiuti. Per i polimeri biodegradabili, spesso ottenuti da fonti rinnovabili, l'ulteriore opportunità di riciclo organico mediante compostaggio o digestione anaerobica per la fine del ciclo di vita di tali prodotti è un elemento molto benefico che ben si adatta ai principi dell'economia circolare. Ciò può essere particolarmente vantaggioso per prodotti diffusi come imballaggi, cura della persona, cosmetici e prodotti sanitari che potrebbero essere gradualmente sostituiti con materiali rinnovabili e biodegradabili.

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Editorial

Polymeric Substrates Modification with Biobased Functional Compounds

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Synthetic polymers and biodegradable and biobased polymers are currently the largest class of materials studied and used for various applications due to their unique and peculiar properties. For manufactured products made of non-biodegradable polymers, effective end-of-life management through mechanical and chemical recycling is crucial for their future consumption, especially in the case of products with short lifetimes that generate large volumes of waste. For biodegradable polymers, often obtained from renewable sources, the additional opportunity for organic recycling by composting or anaerobic digestion for the end-of-life of such products is a very beneficial element that fits well with the circular economy principles [1]. This can be particularly advantageous for widespread products such as packaging, personal care, cosmetics, and sanitary products that could be gradually replaced with renewable and biodegradable materials. Another exciting aspect is that many renewable materials exhibit high biocompatibility, which could facilitate their use in various applications associated with body and skin contact [2].

In addition to their primary function (protection, containment, preservation, etc.), consumer goods must often possess additional properties that enhance product performance. To this end, several approaches have been proposed to endow polymers with specific functionalities, such as antioxidant, antimicrobial, and anti-inflammatory properties. For example, incorporating functional additives into polymer matrices by extrusion or solvent casting [3,4] or the deposition of additives on the surface of the finished product [5] are effective methods that improve the performance of biobased materials and significantly increase their efficiency and competitiveness compared with fossil-derived materials.

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Progressi della ricerca per quanto riguarda l′uso di nanoparticelle di metallo e ossido di metallo come additivi lubrificanti

L′olio lubrificante può ridurre efficacemente l′attrito tra le parti meccaniche, riducendo così il consumo energetico e migliorando la durata e l′affidabilità. A causa dello sviluppo della scienza e della tecnologia, è necessario migliorare le prestazioni dell′olio lubrificante per soddisfare i requisiti tribologici più elevati per contrastare l′usura e fornire lubrificazione. Gli additivi nanolubrificanti hanno i quattro meccanismi di lubrificazione di micro-cuscinetti, film protettivi, lucidatura ed effetti di riparazione. Un additivo nanolubrificante può spesso dimostrare una varietà di meccanismi di lubrificazione allo stesso tempo. Come additivi lubrificanti, le nanoparticelle di metallo e ossido di metallo hanno effetti eccezionali che migliorano le proprietà tribologiche dell′olio lubrificante e sono state ampiamente studiate nel campo della tribologia. Questo documento introduce il meccanismo di lubrificazione dei nanoadditivi e gli ultimi risultati della ricerca per gli additivi per la lubrificazione delle nanoparticelle di metallo e ossido di metallo.

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Review

Research Progress Regarding the Use of Metal and Metal Oxide Nanoparticles as Lubricant Additives

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Abstract: Lubricating oil can effectively reduce friction between mechanical parts, thereby reducing energy consumption and improving service life and reliability. Due to the development of science and technology, it is necessary to improve the performance of lubricating oil to fulfill the higher tribological requirements for countering wear and providing lubrication. Nanolubricant additives have the four lubrication mechanisms of micro-bearing, protective film, polishing, and repair effects. A nanolubricant additive can often demonstrate a variety of lubrication mechanisms at the same time. As lubricating additives, metal and metal oxide nanoparticles have outstanding effects which improve the tribological properties of lubricating oil and have been widely studied in the field of tribology. This paper introduces the lubrication mechanism of nanoadditives and the latest research results for metal and metal-oxide nanoparticle lubrication additives.

Keywords: lubricating oil; nanoparticles; wear

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Riciclo dei rifiuti di vetro in microsfere porose per applicazioni di trattamento delle acque reflue: efficacia della rimozione del colorante

Ogni anno circa 7,6 milioni di tonnellate di vetri per rifiuti vengono collocati in discarica senza riciclo, recupero o upcycling. Qui abbiamo sviluppato un metodo di upcycling privo di solventi per i rifiuti di vetro riciclato (RG) rigenerandoli in microsfere di vetro riciclato poroso (PRGM) al fine di esplorare la rimozione di inquinanti organici come i coloranti organici. Le PRGM sono state preparate tramite processo di sferoidizzazione a fiamma e caratterizzate utilizzando l'analisi di microscopia elettronica a scansione (SEM), diffrazione a raggi X (XRD), Brunauer-Emmett-Teller (BET) e porosimetria antintrusione di mercurio (MIP). Le PRGM hanno mostrato una porosità del 69% con volume complessivo dei pori e area dei pori di 0,84 cm3/g e 8,6 cm2/g, rispettivamente (da MIP) e una superficie di 8 m2/g.

materials MDPI

Article

Upcycling Glass Waste into Porous Microspheres for Wastewater Treatment Applications: Efficacy of Dye Removal

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Abstract: Each year about 7.6 million tons of waste glasses are landfilled without recycling, reclaiming or upcycling. Herein we have developed a solvent free upcycling method for recycled glass waste (RG) by remanufacturing it into porous recycled glass microspheres (PRGMs) with a view to explore removal of organic pollutants such as organic dyes. PRGMs were prepared via flame spheroidisation process and characterised using Scanning Electron Microscopy (SEM), X-ray diffraction (XRD), Brunauer–Emmett–Teller (BET) and Mercury Intrusion Porosimetry (MIP) analysis. PRGMs exhibited 69% porosity with overall pore volume and pore area of 0.84 cm^3/g and 8.6 cm^2/g, respectively (from MIP) and a surface area of 8 m^2/g. Acid red 88 (AR88) and Methylene blue (MB) were explored as a model source of pollutants. Results showed that removal of AR88 and MB by PRGMs was influenced by pH of the dye solution, PRGMs doses, and dye concentrations. From the batch process experiments, adsorption and coagulation processes were observed for AR88 dye whilst MB dye removal was attributed only to adsorption process. The maximum monolayer adsorption capacity

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Divieto contro tassazione, revisione delle potenziali opportunità e sfide dei prodotti in plastica

I prodotti in plastica vengono utilizzati per una varietà di servizi e vengono poi scaricati nella terra dopo l'uso. Queste materie plastiche scaricate influiscono sulla nostra salute, sulle condizioni socioeconomiche, sull'ambiente costiero e marino, nonché sul nostro clima. Lo scopo di questo studio è quello di rivedere sistematicamente le potenziali opportunità e sfide dei prodotti in plastica sotto l'egida del divieto e della tassazione. L'approccio dell'analisi del discorso è stato utilizzato in questo studio per analizzare criticamente e riassumere 42 studi rilevanti. Lo studio ha sviluppato due diverse vie. La prima via (S1) utilizza la tassazione dei prodotti di plastica come strategia alternativa. La seconda via (S2) utilizza il divieto di prodotti di plastica come strategia alternativa opposta.

sustainability

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Review

Banning Vs Taxing, Reviewing the Potential Opportunities and Challenges of Plastic Products

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Abstract: Plastic products are used for a variety of services and are then dumped into the earth after use. These dumped plastics affect our health, socioeconomic conditions, coastal and marine environments, as well as our climate. The purpose of this study is to systematically review the potential opportunities and challenges of plastic products under the umbrella of banning and taxing. The discourse analysis approach was used in this study to critically analyze and summarize 42 relevant studies. The study developed two different storylines. The first storyline (S1) used taxing plastic products as an alternative strategy. The second storyline (S2) used banning plastic products as an opposing alternative strategy. The findings of the study show that taxing plastic products is frequently observed in developed countries, whereas banning plastic products is frequently observed in developing countries. Benefits in regards to revenue generation, creating public awareness, employment opportunities, industrial processes, construction processes, and recycling growth are highlighted under the taxing policy. On the other hand, a cleaner environment, tourism attraction, eco-friendly shopping, and a reduced ecological footprint are highlighted under the banning policy. Governments and policymakers play a critical role in developing and implementing the necessary legislative framework for dealing with plastic products.

Keywords: banning; taxing; plastic products; opportunities; challenges

Citation: Desalegn, G.; Tangl, A. Banning Vs Taxing, Reviewing the Potential Opportunities and Challenges of Plastic Products.

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