

บทความที่น่าสนใจประจำเดือนตุลาคม 2558

สาขาวิทยาศาสตร์และเทคโนโลยี

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| Title: | Study of biofilm influenced corrosion on cast iron pipes in reclaimed water |
| Author: | Haiya Zhang, Yimei Tian, Jianmei Wan, Peng Zhao |
| Journal: | Applied Surface Science, Volume 357, Part A, 1 December 2015, Pages 236–247 |
| Abstract: | Biofilm influenced corrosion on cast iron pipes in reclaimed water was systemically studied using the weight loss method and electrochemical impedance spectroscopy (EIS). The results demonstrated that compared to sterile water, the existence of the biofilm in reclaimed water promoted the corrosion process significantly. The characteristics of biofilm on cast iron coupons were examined by the surface profiler, scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS). The bacterial counts in the biofilm were determined using the standard plate count method and the most probable number (MPN). The results demonstrated that the corrosion process was influenced by the settled bacteria, EPS, and corrosion products in the biofilm comprehensively. But, the corrosion mechanisms were different with respect to time and could be divided into three stages in our study. Furthermore, several corresponding corrosion mechanisms were proposed for different immersion times. |
| Database: | ScienceDirect |
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| Title: | Er-doped ZnO nanofibers for high sensibility detection of ethanol |
| Author: | Yongjiao Sun, Zhenting Zhao, Pengwei Li, Gang Li, Yong Chen, Wendong Zhang, Jie Hu |
| Journal: | Applied Surface Science, Volume 356, 30 November 2015, Pages 73–80 |
| Abstract: | Pure and Er-doped (0.5 at%, 1.0 at% and 2.0 at%) ZnO nanofibers are fabricated by electrospinning for high sensitivity detection of ethanol. We show that the diameter of the ZnO nanofibers decreases from 200 to 70 nm with the increase of Er content but the Er-doping significantly can improve the ethanol-sensing sensitivity of the ZnO nanofibers at an optimum operating temperature of 240 °C. At the optimal Er content of 1.0 at%, the sensitivity of the nanofibers is 3.7 times larger than that of pure ones, showing also a fast response (12 s) as well as a fast system recovering (3 s). Such an improvement of the sensing behavior can be attributed to the enhanced gas adsorption and fast reaction rate of Er-doped ZnO nanofibers. |
| Database: | ScienceDirect |
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| Title: | The deposition of globular polypyrrole and polypyrrole nanotubes on cotton textile |
| Author: | Patrycja Bober, Jaroslav Stejskal, Ivana Šeděnková, Miroslava Trchová, Lenka Martinková, Jan Marek |
| Journal: | Applied Surface Science, Volume 356, 30 November 2015, Pages 737–741 |

Abstract:	Cotton textile was coated with polypyrrole in situ during the oxidation of pyrrole with iron(III) chloride in aqueous medium. Such polymerization results in the globular polypyrrole coating of fibres. In the presence of methyl orange, the coating with polypyrrole nanotubes was obtained. Nanotubular polypyrrole is more conducting and more stable towards the loss of conductivity after deprotonation than globular form. On the contrary, when deposited on cotton, the surface conductivity with the globular form was higher and stability with respect to washing better. This is due to the fact, that the coating with globular form is considerably thicker compared with the deposited nanotubes. This is visible by the difference in colour, black and brown for the globular and nanotubular forms, respectively, and also confirmed by infrared and Raman spectroscopies. The reduction in conductivity after repeated washing is large and the textile becomes practically non-conducting for both polypyrrole forms. The repeated chemical cleaning of the textile with globular polypyrrole coating, however, is associated only with the marginal decrease in conductivity.
Database:	ScienceDirect

4	Title:	Deposition and characterization of E-paint on magnesium alloys
	Author:	Nguyen Van Phuong, Sungmo Moon
	Journal:	Progress in Organic Coatings, Volume 89, December 2015, Pages 91–99
	Abstract:	Electrophoretic paint (E-paint) was investigated on four different magnesium substrates: as-extruded AZ61 (AZ61), heat-treated AZ61 (AZ61-H), as-extruded TZ61 (TZ61) and heat-treated TZ61 (TZ61-H), to elucidate the effect of heat treatment and alloying elements on the deposition and characterization of E-paint. It was found that, a rapid increase of voltage, indicating the deposition of E-paint, was observed after an induction time of 0.39 min for AZ61-H, 0.43 min for AZ61, 0.51 min for TZ61-H and 0.58 min for TZ61. The amount of E-paint deposited on the four different samples was approximately similar, but the electrical charge used for the deposition process on the heat-treated samples was smaller than that on the as-extruded samples. Current efficiencies of E-painting on AZ samples (AZ61 and AZ61-H) were higher than those of TZ samples (TZ61 and TZ61-H), and the current efficiencies on the heat-treated samples were higher than those on as-extruded samples. All E-paintings on the four different magnesium substrates had an excellent adhesion without showing any detachment by tape peel test. After immersion test in deionized water (DI water) for 500 h at 40 °C, however, many large blisters were formed on the surface of AZ samples, and none or small blisters were observed on TZ samples. Salt spray test (SST) results showed that blisters were formed adjacent to the scratches on the E-painted AZ samples, while they were formed at the intact areas of E-painted TZ samples. The E-paints on heat-treated samples showed much better corrosion resistance than those on as-extruded samples.
	Database:	ScienceDirect

5	Title:	Spray coating process variable and property analysis of UV-curable polyurethane acrylate coating on polycarbonate substrate
	Author:	Areeya Rungwasantisuk, Soranat Raibhu
	Journal:	Progress in Organic Coatings, Volume 89, December 2015, Pages 132–142
	Abstract:	A series of spray coating experiments were conducted on an UV-curable, polyurethane-modified, acrylate-based coating formulation with the aim to control defects, coating thickness, and thickness variation. Statistical approaches including design of experiment, residual examination, analysis of variance, and t-test were used in designing the experiments and analyzing data. Viscosity of formulation, atomizing pressure, liquid feeding pressure, distance between nozzle and substrate, and travel speed of substrate were the process variables studied. The ranges of process variables that gave defect-free coating were identified and used in the subsequent experiments to determine process variables and interactions that had significant contribution to the changes in coating thickness and thickness variation. All process variables studied were found to have contribution to the change in coating thickness, but they showed no significant contribution to the variation of coating thickness. No interaction displayed significant contribution. Confirmation tests performed on extra samples prepared with varying coating thicknesses indicated a good agreement with the experimental results. Additional samples were tested for total transmittance, transmission haze, adhesion, surface roughness, hardness, scratch hardness, abrasion resistance, and durability to attack of car wash chemicals. Spray coated samples showed slight improvement in the total transmittance over the uncoated samples, while maintaining the transmission haze and exhibiting rougher surfaces. Only samples with thin coatings were found to possess sufficient adhesion to the substrate. These thin coatings gave improved hardness, scratch hardness, and durability to car wash attack to the level comparable to commercial coated polycarbonate headlamp lenses, whilst giving better abrasion resistance.
	Database:	ScienceDirect

6	Title:	Fast and easily applicable glycerol-based spray coating
	Author:	Tobias Becherer, Matheus Vieira Nascimento, Julian Sindram, Paul-Ludwig Michael Noeske, Qiang Wei, Rainer Haag, Ingo Grunwald
	Journal:	Progress in Organic Coatings, Volume 87, October 2015, Pages 146–154
	Abstract:	This work describes the fabrication and evaluation of a transparent hydrogel based spray coating to reduce marine biofouling on glass surfaces. A glycerol based copolymer was synthesized and covalently immobilized by applying a simple spray coating procedure. To test its nonfouling behavior, modified glass surfaces were exposed to different marine fouling species including bacteria, green algae, and blue mussels. For all tested species the coating could considerably reduce the settlement as compared to pristine glass surfaces. The settlement of blue mussels on coated surfaces was

	<p>additionally compared to polytetrafluoroethylene (PTFE) substrates. The glycerol based copolymer showed an even better resistance against blue mussel adhesion than PTFE. Furthermore, the nonfouling performance of the coating was tested via fibrinogen adsorption after aging coated silica slides under marine conditions. The major aim of this study is to provide an easy synthesis and application procedure for a polyglycerol based nonfouling coating and the evaluation of its nonfouling properties in marine environments.</p>
Database:	ScienceDirect

7	<p>Title: 3D CFD Simulations: Effect of Operation Parameters on the Deposition of Photocatalytic TiO₂ Nanoparticles by MOCVD</p>
	<p>Author: Siti Hajar Othman, Suraya Abdul Rashid, Tinia Idaty Mohd. Ghazi and Norhafizah Abdullah</p>
	<p>Journal: Chemical Vapor Deposition, Volume 21, Issue 4-5-6, pages 99–110, June 2015</p>
	<p>Abstract: A 3-dimensional (3D) computational fluid dynamics (CFD) simulation study on the effect of temperature and carrier-gas flow rate on the deposition of photocatalytic titanium dioxide (TiO₂) nanoparticles by metal-organic (MO)CVD is presented. The model predicts the temperature, velocity, mass fraction of reactants and products, kinetic rate of reaction, and surface deposition rate profiles. Increasing temperature and reducing carrier gas flow rate increases the deposition rate and hence the amount of nanoparticles produced. Unlike carrier-gas flow rate, temperature is significant in determining the rate of surface deposition. Simulation results are validated by experiments whenever possible due to limited data. Decent agreement between experiment and simulation supports the reliability of the simulation.</p>
	<p>Database: Wiley Online Library</p>

8	<p>Title: CFD Simulations of Hydrodynamics of Conical Spouted Bed Nuclear Fuel Coaters</p>
	<p>Author: Senem Şentürk Lüle, Uner Colak, Murat Koksal and Gorkem Kulah</p>
	<p>Journal: Chemical Vapor Deposition, Volume 21, Issue 4-5-6, pages 122–132, June 2015</p>
	<p>Abstract: The ability of the two fluid method (TFM) to predict the gas-solid flow phenomenon in conical spouted beds operated with high density (6050 kg m⁻³) particles simulating the nuclear fuel coating conditions is investigated. The effects of geometric and operational factors, such as conical angle and static bed height, are also assessed. The results show that TFM predicts the time-averaged bed pressure drop quite well. The qualitative variation of the particle velocity, solids volume fraction, and axial particle flux with axial height are captured by the simulations. The simulated trends observed in the investigation of the effects of static bed height and conical angle on the particle velocity, solids volume fraction, and axial particle flux agree well with those of the experimental measurements.</p>
	<p>Database: Wiley Online Library</p>

9	Title:	High-performance nanofibrous membrane for removal of Cr(VI) from contaminated water
	Author:	Yang Liu, Hongyang Ma, Brendan Liu, Benjamin S Hsiao, and Benjamin Chu
	Journal:	Journal of Plastic Film and Sheeting, October 2015 vol. 31 no. 4 379-400
	Abstract:	A simple and effective approach for the preparation of electrospun nanofibrous microfiltration membrane having positive surface charges, capable of removing Cr(VI) from contaminated water, was demonstrated. In this membrane, polyacrylonitrile was electrospun into a nanofibrous scaffold with an average fiber diameter of about 200 nm. Polyvinylamine, a positively charged polymer was grafted onto the nanofibrous scaffold through cross-linking reaction by glutaraldehyde. The microfiltration characteristics of the original and modified membranes, such as the maximum and mean pore size, particle rejection ratio, pure water flux and mechanical strength, were investigated. The effects of the pH value (1.0 to 13.0) and initial Cr(VI) concentration (5 mg/L to 100 mg/L) on the static adsorption rate of the membrane were also studied. Both experimental and theoretical results showed that the optimal pH range for Cr(VI) adsorption was from 3.0 to 5.0. Due to the high surface charge density, the polyvinylamine -grafted nanofibrous membrane exhibited a saturation adsorption capacity of 57.1 mg Cr(VI) per gram of the membrane, based on the Langmuir model analysis, and also a high Cr(VI) adsorption capacity in the dynamic adsorption test. In addition, this membrane could be regenerated from the desorption of Cr(VI) using a 0.1 mol/L of NaOH aqueous solution.
	Database:	Sage Journals Online

10	Title:	Melting behavior of thin polyethylene films
	Author:	Tisato Kajiyama, Hirohiko Yakabe, Daisuke Kawaguchi, Atsushi Takahara, and Keiji Tanaka
	Journal:	Journal of Plastic Film and Sheeting, October 2015 vol. 31 no. 4 401-413
	Abstract:	Melting behavior in thin films of linear low-density polyethylene (LLDPE) and high-density polyethylene (HDPE) was studied by local thermal analysis (μ TA). Even in the films thinner than 100 nm, the melting temperature (T_m) was successfully observed by μ TA. For LLDPE, T_m decreased as the thickness became thinner than 150 nm. For HDPE, T_m increased with decreasing thickness. Polarized infrared spectroscopy revealed that an edge-on lamellar structure formed in both cases, meaning that the crystallite orientation may not be a reason why the thickness dependence of T_m was not the same for both resins. A possible explanation is that for LLDPE the segmental mobility in the amorphous region predominates with decreasing thickness, and for HDPE the chain orientation in the region predominates with decreasing thickness.
	Database:	Sage Journals Online