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MAKLUMAT PERDAGANGAN DAN PERNIAGAAN / *TRADE AND COMMERCIAL INFORMATION*

PENANG ON BIOTECH DRIVE

Penang, often referred to as the "Silicon Island of the East", is embarking on a biotechnology drive in a bid to attract investment and research activities. The move attempts to leverage on the biotechnology demand which is projected to spin an industry worth US$1.76 trillion (RM6.7 trillion) by 2010, sources were quoted. The 176-hectare plot of land at the Bukit Minyak Industrial Park has already attracted three biotechnology projects with a total investment estimated at US$70 million. The biggest of these is London-listed firm GeneMedix Plc, which last year signed a letter of intent with the Penang Development Corporation (PDC) to produce human insulin to meet the expected rise in demand from diabetes patients across Asia. The investment is US$35 million. The two other projects are a US$20 million contract manufacturing plant to produce compounds used in cancer-fighting drugs and a US$15 million contract research firm specialising in pre-clinical trials.

TORAY, BASF TO SET UP PLASTICS VENTURE IN MALAYSIA

Japanese chemical giant Toray and Germany's BASF plan to form a joint venture in Malaysia to produce a high-performance plastic used in cars and electronic components. The leading business daily Nihon Keizai Shimbun said the two leading synthetic fibre makers will produce polybutylene terephthalate (PBT), a climate- and heat-resistant plastic. BASF AG operates a plant in Pahang that produces PBT precursors. Toray and BASF plan to build a PBT facility adjacent to that site for an amount limited to about five billion yen. Production will initially be 60,000 tonnes a year, with the firms equally dividing the output. If demand increases, they will consider expanding the capacity to 100,000 tonnes annually.

Toray already produces 24,000 tonnes of PBT annually at its plant in Ehime, southern Japan. But with Asian demand for the material expected to grow by about 10% a year, the chemical maker wants to establish an overseas production site. Global demand for PBT reached about 500, 000 tonnes in 2003, with US maker GE Plastics as the top producer, sources were quoted.

KANDUNGAN / *CONTENTS*

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TITAN INVESTING MORE TO BOOST CAPACITY, PRODUCT RANGE

Titan Petrochemicals and Polymers Bhd, which has invested a total of RM5.5 billion in its petrochemical facilities in Johor, plans to spend a further US$70 million (RM266 million) in the next two to three years to increase capacity and product range. The company, the country's biggest petrochemical and polymer producer, had drawn up operational plans to take advantage of the industry upturn, and to expand in the export markets, especially China. Of the US$70 million investments, US$32 million (RM121.6 million) would be used to expand its current naphtha cracking capacity to an annual rate of 1.1 million tonnes, up from the current 964,000 tones, sources were quoted. It is now South-East Asia's fourth largest naphtha cracker company. In addition, Titan also plans to spend about S$3 million (RM11.4 million) to boost its polymer production by about 45,000 tonnes per annum in the short term, before eventually raising it to 65,000 tonnes. Titan also plans to spend about US$35 million (RM133 million) to expand its new butane dyne extraction facilities, providing a basic ingredient in the production of synthetic rubber products, to diversify its product range.

CUBA AND MALAYSIA IN BIOTECH EFFORTS

Universiti Sains Malaysia (USM) has signed five memoranda of agreements with research institutions in Cuba to pave the way for collaboration in biotechnology, providing a further boost to Malaysia's Bio Valley Programme, sources were quoted. The deals are for collaboration in areas ranging from the development of vaccines for tuberculosis to biomaterials, neuroscience and aquaculture. USM Vice-Chancellor Professor Dato' Dzulkifli Abdul Razak said that other research links effected by USM in Cuba were with the International Centre of Neurological Restoration (Ciren) in the development of stem cell and neural cells (cells related to the nervous system). He said that with the agreement signed between USM and Ciren, two research teams would each undertake stem cell and neural cell research separately, with one team working on producing stem cells for biomaterials. The second team will study the culture of isografts or mesenchymal cells (cells that develop into connective tissue, blood vessels, and lymphatic tissue) for brain and spinal cord transplants.Penang, along with Malacca, Sarawak and Sabah, have been earmarked by the Government to serve as Bio Valley 'satellite' centres.

HEXZACHEM, NORSECHEM TO USE TECHNOLOGY FROM ORICA AUSTRALIA

Adhesive and resins manufacturer Orica Australia Pty Ltd will transfer its technology in the manufacture and application of low-emission resins to Hexzachem Sarawak Sdn Bhd and Norsechem Resins Sdn Bhd, sources were quoted.Hexzachem and Norsechem, both subsidiaries of Hexza Corp Bhd, will use the technology to manufacture particle boards, medium density fibre boards and plywood panels. The agreement will pave the way for joint product development by Hexzachem and Norsechem, increase their product range, and enhance the quality of their existing products. The agreement represented Hexza's continuous efforts to apply the latest resins technology and formulations to cater to the increasing demands of customers. More than 70% of Hexzachem and Norsechem products are exported to Japan, Europe, and the US, among other markets.

RENESAS TECH TO INVEST RM120M IN PENANG

Renesas Technology Corp's expansion activities in Malaysia will see the company inject RM120 million into its Penang plant this year, sources were quoted. Of this total, RM3.8 million is being earmarked for design and development (D and D) work. Renesas Technology Corp designs and manufactures highly integrated semiconductor system solutions for mobile, network, automotive, industrial and digital home electronics markets. Established on April 1 2003, Renesas is a joint venture between Hitachi Ltd and Mitsubishi Electronics Corp and headquartered in Tokyo.

MASTERPLAN FOR 3 BIOVALLEY INSTITUTIONS BY END-2005

A masterplan for the proposed three institutions to spearhead the development of the Bio Valley project is expected to be ready by the end of 2005. Science, Technology and the Environment Ministry Secretary-General Datuk Leong Ah Hin said the Development Committee on BioValley has begun to outline the masterplan for the set-up of the three institutions. The Committee comprises users who are scientists, the ministry's officials, consultants and relevant government agencies. Leong said the three proposed institutions will focus on core activities under biotechnology, namely agro biotechnology, pharmaceutical and nutraceutical, and genomics and molecular biology. The three institutions will be housed on 24ha of the 80ha site identified for the development of Bio Valley project in Dengkil, Selangor. Targeted to start operations by 2006, the Bio Valley hub project has attracted interests from some 100 companies, including from the Netherlands, China, South Korea and Australia, with projected investments of some RM200 million. He said the Government has allocated RM300 million under the Eighth Malaysia Plan (2001-2005) for the Bio Valley hub project, sources were quoted.

MAKLUMAT PENGELUARAN / *PRODUCT INFORMATION*

FDA APPROVES FIRST-OF-A-KIND CANCER DRUG

Genentech, Inc. (NYSE: DNA) announced that the U.S. Food and Drug Administration (FDA) has approved Avastin ™ (bevacizumab) to be used in combination with intravenous 5-Fluorouracil-based chemotherapy as a treatment for patients with first-line-or previously untreated-metastatic cancer of the colon or rectum. Avastin is the first FDA-approved therapy designed to inhibit angiogenesis, the process by which new blood vessels develop, which is necessary to support tumor growth and metastasis, sources were quoted.

NEW RESOURCE PLANNING SOFTWARE SHIPS FROM AUTOSCRIBE

Laboratory management systems supplier Autoscribe has launched its Resource Planner resource tracking and planning product for use in laboratories, sources were quoted. The new product is designed to be easy to use and eliminates any loss of resources, according to the company. The software also uses 'what if' scenarios by recalculating work completion times and adjusting the priority of tasks accordingly. Resource Planner is built using the Microsoft.NET framework and has the look and feel of Matrix LIMS.

FHMCHIP FOR CONTAMINATED WATER

EcoArray is a University of Florida spinoff that uses genetic information from fish and other aquatic species to make microchip products. This year, the company plans to launch a product called the FHMChip - or the fithead minnow chip, sources were quoted. The chip analyzes water for contamination using a genetic database from the fithead minnow, a fish used as a sentinel species by the Environmental Protection Agency to check for pollutants.

REBUILDING TEETH

NovaMin Technology, based in Alachua, Florida, which manufactures mouth-care products that react chemically to teeth to rebuild them, received its first FDA clearances at the end of 2003 and plans to take at least two products to market in 2004, sources were quoted. The company's additive is made from a bioactive material also used for bone regeneration, sources were quoted. It claims to make teeth "less sensitive, cleaner, whiter and healthier than possible with old technologies." A cleaning paste and a root conditioner both make their debut in dental offices this year.

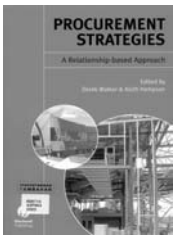
RSA KEEPS RFID PRIVATE; “BLOCKER TAG' WILL PREVENT ACCESS TO RFID TAGS BY EAVESDROPPERS

RSA Security Inc. will unveil a finished version of its RFID "Blocker Tag" technology that prevents radio-frequency identification tags from being read, sources were quoted. The technology is one of the industry's first attempts to secure the anticipated oceans of consumer tracking data to be gathered by the tiny radio-powered tags. According to company researchers and security experts, RSA blocker technology could have a profound and positive effect on the budding RFID industry, which has been drawing intensifying criticism from civil libertarians and consumer advocates over privacy concerns.
The blocker tag system is software-based and relies on technology developed by RSA researchers that prevents RFID readers from gathering data from other tags in their immediate vicinity. Without it, any RFID reader could query any tag, enabling retailers or other companies to read the tags on any merchandise a customer may be carrying.

BAYER UNVEILS THREE NEW TECHNOLOGIES

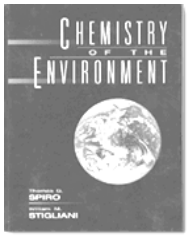
Bayer Fine Chemicals has unveiled a series of technologies, including chemical coupling agents, a new fluorination agent, and an asymmetric epoxidation process, as part of an effort to enhance its custom service offering to pharmaceutical companies. The coupling chemistry is based on a technique developed by the Massachusetts Institute of Technology (MIT; Cambridge, MA) for carbon-nitrogen and carbon-oxygen reactions, sources were quoted. A Partnership of Bayer and Rhodia Pharma Solutions says it has applied the coupling technology for commercial scale production of heteroatomic compounds, which are required in a variety of target pharma molecules. Bayer also says it has begun producing commercial-scale quantities of phosphane ligands used in the coupling reactions. Bayer has also developed a new class of fluorination reagents, branded Fluorinox. The reagents are cost-effective, easy to scale up, and are a viable alternative for the stereoselective replacement of hydroxyl groups with fluorine, and the transformation of carbonyl functions into geminal difluorides.The company has also developed a commercial-scale process for the asymmetric epoxidation of unsaturated carbonyl compounds. The company says it optimized a reaction first developed by chemists in the 1980s by adding a cocatalyst. The use of a special cocatalyst reduces the required amounts of bases and oxidizing agents and shortens reaction times, making the reaction practical on an industrial scale for the first time.

ULASAN BUKU / *BOOK REVIEWS*



PROCUREMENT strategies: a relationship-based approach. Walker, Derek and Hampson, Keith, eds. Oxford: Blackwell Science, 2003. (HD9715.A2P964 2003)

This book addresses the critical relationship issues for a more collaborative and sustainable construction industry. It looks at how project procurement and project alliancing partner selection works, and how risk and crisis resolution are managed. It provides readers with guidance and models on how to put a relationship-based approach to procurement into practice, drawing on specific prototypes from an actual, successful project that can be adapted.



CHEMISTRY of the environment. Spiro, Thomas G. & Stigliani, William M. 2nd ed. Upper Saddle River: Prentice Hall, 2003. (TD193.S759 2003)

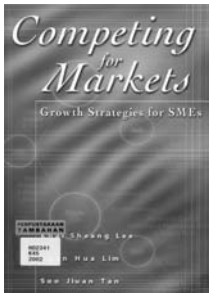
This text helps readers to see that their knowledge of basic chemistry can be used to understand the nature of the Earth and the impacts that humans are having upon it. Spiro and Stigliani identify major environmental issues in the areas of energy, atmosphere, hydrosphere and biosphere, then analyze the chemical basis of those issues. The text is compact, yet comprehensive, connecting (1) basic chemical understanding to environmental issues and (2) the links between socio-economic indicators and impacts on the environment. Incorporating the newest developments in environmental science, *Chemistry of the Environment* is an up-to-date and thorough analysis of Environmental Chemistry.

BUILDING design cost management. Jagger, David, *et al.* Oxford: Blackwell Science, 2002. (TH435.B932 2002)

This introductory textbook explains the development, application and pivotal role of design cost management from inception through to completion of a project, and considers its context and relevance within current construction procurement arrangements, including design and build. The text discusses the need for improvements in communication between all those involved in the process, and outlines how to achieve better information management, underpinned by information technology, to help overcome the criticisms of the industry for too often delivering projects late, over budget and of poor quality.

MATERIALS and processes in manufacturing. DeGarmo, E. Paul, *et al.* 9th ed. Hoboken: John Wiley & Sons, Inc., 2003. (TS183.D3176 2003 Kejuruteraan)

This book provides a descriptive introduction to manufacturing processes, materials, and manufacturing systems. It includes numerous illustrations, photographs, and diagrams throughout the text, and presents a solid integration of materials and processes. It also maintains the emphasis on application and design established in previous editions.



COMPETING for markets: growth strategies for SMEs. Khai, Sheang Lee, Guan, Hua Lim & Soo, Jiuan Tan. Singapore: McGraw-Hill, 2002. (HD2341.K45 2002)

A pioneer in its approach, this book focuses on strategies for small and medium enterprises (SMEs) when they compete for markets under resource constraints. The authors provide a set of prescriptive strategy tools to assist strategic planners and practitioners when they are faced with resource disadvantages. The basis for these tools is a conceptual framework for generic strategies for SMEs that uses a deductive approach based on game theory. Nine chapters describe generic strategies for SMEs in detail. To facilitate learning, each chapter contains Asian case illustrations, detailed analyses of these cases, and lessons learned from these analyses.

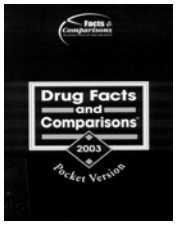
ELECTRONICS manufacturing: with lead-free, halogen-free, and conductive-adhesive materials. Lau, John H. New York: McGraw-Hill, 2003.

(TK7836.L366 2003 Kejuruteraan)

This book covers manufacture of printed circuits, integrated circuits, printed circuit boards assemblies, electronic packages, and more.

ADVANCES in sport, leisure and ergonomics. Reilly, Thomas & Greeves, Julie, eds. London: Routledge, 2002. (RC1235.A244 2002)

This important volume brings together research by leading international ergonomists and sport and exercise scientists, as presented at the 4th International Conference on Sport, Leisure and Ergonomics. The book presents a wide range of studies in occupational ergonomics, each utilizing techniques that are also employed by sport and exercise science research groups. It therefore breaks new ground in the interface between sport and industry. Arranged into sections examining environment, special populations, human factors interface, sports technology and occupational health, this is essential reading for all those involved in sports science or ergonomics research.



DRUG facts and comparisons, 2003, 2002. (RM1.D794 r Pocket version)

Drug Facts and Comparisons - Pocket Version is the indispensable portable drug reference for busy professionals. Derived from Drug Facts and Comparisons the premier source of unbiased drug information for more than 55 years, its abridged monographs include the information you most often need "on the move"- an ideal compact reference for rounds and use in the clinic.

STOCHASTIC dynamics of reacting biomolecules. Ebeling, Werner, Schimansky-Geier, Lutz & Romanovsky, Yuri M. Singapore: World Scientific, 2002. (QP517.R4E15 2002)

This is a book about the physical processes in reacting complex molecules, particularly biomolecules. In the past decade scientists from different fields such as medicine, biology, chemistry and physics have collected a huge amount of data about the structure, dynamics and functioning of biomolecules. Great progress has been achieved in exploring the structure of complex molecules. However, there is still a lack of understanding of the dynamics and functioning of biological macromolecules. In particular this refers to enzymes, which are the basic molecular machines working in living systems. This book contributes to the exploration of the physical mechanisms of these processes, focusing on critical aspects such as the role of nonlinear excitations and of stochastic effects. An extensive range of original results has been obtained in the last few years by the authors, and these results are presented together with a comprehensive survey of the state of the art in the field.

MAKLUMAT PENYELIDIKAN DARI USM / *RESEARCH INFORMATION FROM USM*

THE USE OF LANDSAT TM DATA IN THE STUDY OF TOTAL SUSPENDED SOLIDS ASSOCIATED WITH THE MUDA RIVER PLUME

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ABSTRACT
Landsat TM data have been used to study total suspended solids (TSS) associated with the Muda river plume. An empirical approach of relating TM data with ground reference data for this parameter through regression analysis was done for estimating its concentrations over the coastal water. High concentration (>200mg/l) of TSS was found (i) in the immediate vicinity out site the Muda river mouth and (ii) along the coast – to the north and south of the river mouth. The former result may be attributed to the direct effect of the river discharge whilst the latter being influenced by the wave activity along the shallow coastline. Result also shows that the concentrations of TSS within the plume area were satisfactorily correlated with the total monthly rainfall.

HYDROCRACKING AND HYDRODESUL PHURIZATION OF PETROLEUM RESIDUE OIL OVER NICKELMOYBDENUM/ALUMINA BORATE CATALYSTS

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ABSTRACT
Hydro cracking activities of NiMo/Aluminum borate (NiMo/AB) catalysts were studied and compared with commercial NiMo/$A1_2O_3$ catalyst. A series of alumina borate supports with various alumina borate (A/B) ratios were prepared by precipitation method. NiMo/AB catalysts were prepared by impregnation of $Ni(NO_3)_2.6H_2O$ and $(NH_4)_6Mo_7O_{24}.4H_2O$ solution. These samples have been characterized with respect to surface areas, average pore diameters, pore size distribution, thermal stability and acidity strengths. Hydro cracking and hydridesulphurization (HDS) of atmospheric petroleum residue oil over NiMo/AB catalysts was carried out in a batch reactor at 340ºC, 3 h reaction time and 0.5 g catalyst loading. The results revealed that these catalysts were more active than the commercial NiMo/$A1_2O_3$ catalyst for hydro cracking process. The yield of gasoline was in the range of 11.5 to 13.5 wt% over NiMo/AB catalysts compared to 10.12 wt% over commercial NiMo/$A1_2O_3$ catalyst. The catalyst with A/B ratio of 3.5 gave the highest gasoline product. The capability of sulfur removal over commercial NiMo/$A1_2O_3$ catalyst was better than over some of iMo/AB catalysts. The percentage of sulfur removal was in the range of 20% to 36% with NiMo/AB catalysts compared to 34% with commercial NiMo/$A1_2O_3$ catalyst.

INFLUENCE OF ELICITOR AVAILABILITY ON LIMONENE AND LINALOOL ACCUMULATION FROM CITRUS GRANDIS CELL CULTURE

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ABSTRACT
Suspended callus cultures of Citrus grandis were elicited with chitosan, a polycationic polimer and also a permeabilizing agent. The procedure, which is based on measurements of the conductivity of the culture medium after addition of chitosan ranging from 0.5 to 7.0 mg per g fresh weight callus, has been applied to modified Murashige and Skoog (MS) medium. Low concentration of chitosan (0.5 mg/g fr.wt.) stimulate limonene production and at the same time increase linalool content. Maximum limonene and linalool accumulations were observed from cultures elicited with 1.0 mg chitosan/g fr. wt. callus incubated for 2 hours. Chitosan successfully influenced limonene and linalool accumulation in a short period and not to permeabilization of the cells.

AGE-RELATED CHANGES IN THE IMMUNE SYSTEM OF GROWING RATS UNDER ACUTE AND CHRONIC STRESS CONDITIONS

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ABSTRACT
Stress results in a wide range of physiological responses in the body including suppression of immune function. Only few studies evaluate stress-induced changes in the immune system of the growing body, and the results reported for different ontogenetic stages are controversial. We have evaluated the impact of stress on the immune organs of preweaning, postweaning, infant and juvenile animals. Four experimental groups of prepubertal Sprague-Dawley rats (14, 21, 30 and 45 days old, 8 animals per group) were exposed to either acute (one 5-hour session) or chronic (seven 5-hour daily sessions) restraint stress and assessed against age-matched control groups (6 rats per group). Thymuses and spleens were examined using routine histological and immunohistochemical staining for CD3, CD8, CD90, CD45R, EDI and caspase-3. Acute and chronic stress differentially affected the immune organs of the growing body. Splenic T-zones were mainly affected under acute stress conditions, while in chronic stress both T- and B-zones were involved in immunomodulation, with the B-zones subject to immunosuppression, and T-zones revealing certain adaptation processes. Stress-induced immunomodulation depended on the age of the animal. It was most prominent in the animals undergoing stress during weaning period. These alterations differ from those reported in adulthood suggesting distinct adaptation potential in growing body under stressful conditions.

A REVIEW IN TOPOLOGY OPTIMIZATION METHOD AND ITS CURRENT DEVELOPMENTS

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ABSTRACT
Topology optimization generates the optimal shape of a mechanical structure. It is a complex and intellectually highly challenging field since it involves problems in mathematics, mechanics, computer technology and material sciences. This paper reviews the importance and challenges in topology optimization compare to other structural optimization approaches. It explains how the chosen domain (layout) is optimised after considering all of its support conditions and applied loads. Some examples of the current applications are also presented.

PM_{10} CONCENTRATION MEASUREMENTS AT FOUR SELECTED SITES IN SEMENANJUNG MALAYSIA: A COMPARASION BETWEEN SITES WITH DIFFERENT BACKGROUND

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ABSTRACT
Mass concentration of ambient particulate matter with aerodynamic diameter less than 10 um (PM_{10}) are reported for four sites in Semenanjung Malaysia over an eight months monitoring period. The PM_{10} were measured using Beta Attenuation (BAM) monitors. Analysis of the ambient mass concentration data with reference to daily averages concentrations (DAC) and monthly average concentrations (MAC) are presented. Results shows that the PM_{10} DAC at site with industrial background range between 39 – 159 ugm^{-3} and MAC ranges between 60 – 92 ugm^{-3}. The site with residential background recorded PM_{10} DAC between 21 to 131 ugm^{-3} and PM_{10} MAC ranges between 34 – 64 ugm^{-3}. The sites with suburban background records PM_{10} DAC ranges between 21 – 110 ugm^{-3} and range for PM_{10} MAC between 40 – 59 ugm^{-3}. The traffic background site recorded MAC between 60 to 90 ugm^{-3} and PM_{10} DAC between 40 to 162 ugm^{-3}. Several high PM_{10} concentration days were observed and due to the effect of trans boundary sources from Indonesia forest fires.

SHAPE SIMILARITY MEASURE USING POLYNOMIAL CURVE REPRESENTATION

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ABSTRACT

Large image databases are used in many multimedia applications such as entertainment, business, art, engineering and science. Searching information in these databases is a crucial problem to be solved for the development of visual information system. Therefore efficient retrieval methods are required for the purpose of finding a desired image from a collection of images. This research is focused on developing a shape-based image retrieval system for use in thematic databases. In thematic databases, all the images are highly similar to each other. For this purpose, a novel shape similarity matching methodology is needed in order to detect a small similarity difference between two images. This similarity difference is indicated by the computed similarity measure that is used to display a set of relevant images from the databases. The similarity measure introduced here bears resemblance to the human notion of similarity. In the real-time shape-based image retrieval systems, the accuracy of the retrieval results and the retrieval time are two aspects that need to be looked into before any application is possible. In the past decade, shape similarity matching methodology has evolved and is influenced by two general approaches: feature vector approach and shape transformation approach. Feature vector approach provides fast retrieval time but does not ensure high accuracy retrieval result, whereas shape transformation approach has the ability to ensure high retrieval accuracy but it involves high computation time. Thus a new methodology, referred to as NURBS-warping approach is implemented by integrating the advantages of the two approaches. In the proposed approach, Non-Uniform Rational B-Spline (NURBS) and Gradient Vector Flow (GVF) are incorporated to ensure accurate and fast retrieval results. NURBS is a compact and accurate shape descriptor, whereas GVF ensures fast and accurate matching results. The effectiveness of the NURBS-warping approach is examined by carrying out experiments on a collection of one thousand and one hundred highly similar images from a thematic fish database. The overall retrieval results conclude that the proposed approach is able to derive an accurate similarity measure that resembles human similarity judgment.

DEVELOPMENT OF PHOTOCATALYTIC REACTOR FOR THE TREATMENT OF WASTE WATER CONTAINING ORGANIC POLLUTANTS

Chin Mei Ling, Abdul Rahman Mohamed and Subhash Bhatia
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ABSTRACT

Transparent TiO_2 thin films were prepared using sol-gel method on pyrex glass tubes. The parameters affecting sol-gel process included water:alkoxide ratio, solven:alkoxide ratio, reaction temperature, and catalyst were studied in the preparation of the coating solution. The source to the TiO_2 was tetra-isopropyl ortho-titanate (TPOP), and 2-propanol (PrOH) was used as the solvent. Acetic acid was used as a catalyst and Acetyl acetone was used as a stabilizing agent. The samples were prepared by the sol-gel method using different gelation pH and different calcinations temperatures. The thickness of the thin film was controlled by dip-coating cycles at a constant withdrawal speed of 0.9mm/s to 1.1mm/s. The photocatalytic degradation of dye in aqueous solution was investigated in an immobilized system with the TiO_2 catalyst coated on the inner wall of a tubular reactor. Methylene blue was chosen as model compound for the study of photocatalytic reactor performance. The performance of photocatalytic reactor was studied by varying different process parameters such as feed flow rate, thickness of coated TiO_2 layer, initial dye concentration, and the total volume of the dye solution in the reservoir tank.

CHEMICAL COAGULATION OF SETTELABLE SOLID-FREE PALM OIL MILL EFFLUENT (POME) FOR ORGANIC LOAD REDUCTION

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ABSTRACT

The viability of pre-treatment process through sedimentation and coagulation was studied for two purposes i.e. valuable POME solids recovery and reduction of organic loading on the down stream treatment processes. The idea of gravity sedimentation was utilized to separate settle able solids from POME and subsequently optimization of the combined coagulation and flocculation was closely studied. Here, combined use of Alum, polyaluminium chloride (PAC), $FeC1_3$ or $FeSO_4$ and anionic polymer were studied using modified jar test method where their efficiencies were gauged on the basis of the BOD_3, COD and SS removal. Results showed that optimization of coagulation and flocculation processes on settle able solid-free POME was generally reached at between 150-200ppm of FeSO and $FeC1_3$, and 300-350 ppm of alum and PAC. The optimum coagulant dosages were found to be dependent on the strength of the wastewater. The coagulation pH was found to be having minimal effect on the process between pH 3.7. That means pH adjustment prior to coagulation and flocculation might be omitted without detrimental effect on the process.

PERKHIDMATAN KESEDARAN KINI / *CURRENT AWARENESS SERVICE*

ADHESIVES

1) ADHESIVE properties of corn zein formulations on glass surfaces. Parris, Nicholas and Dickey, Leland C. *Journal of agricultural and food chemistry.* 2003: 51(13), 3892-3894.
2) ADHESION between addition-curable silicone elastomer and nylon using diallylbisphenol a adhesion promoter. Kerboua, Rachid. *Journal of applied polymer science.* 2003: 89(13), 3496-3499.
3) BROMINATED phenol – formaldehyde resin as an adhesive for plywood. Petsom, Amorn, *et al. Journal of applied polymer science.* 2003: 89(7), 1918-1924.
4) CONTROL of structure and tack properties of acrylic pressure-sensitive adhesives designed by a polymerization process. Aymonier, A., *et al. Journal of applied polymer science.* 2003: 89(10), 2749-2756.
5) GLUE? Yes, glue maker hope a foray into plastics sticks. Valero, Greg. *Modern plastics international.* 2003: 33(12), 28.
6) NANO-alumina modified epoxy based film adhesives. Gilbert, Eric N., *et al. Polymer engineering and science.* 2003: 1096-1104.
7) WATER-soluble/dispersible cationic pressure-sensitive adhesives. I. Adhesives from solution polymerization. Yan, Zegui and Deng, Yulin. *Journal of applied polymer science.* 2003: 90(6), 1624-1630.

AGRICULTURE

8) AQUATIC hypoxia is an endocrine disruptor and impairs fish reproduction. Wu, Rudolf S.S., *et al. Environmental science & technology.* 2003: 37(6), 1137-1141.
9) PESTICIDE adsorptivity of aged particulate matter arising from crop residue burns. Yang, Yaning and Sheng, Guangyao. *Journal of agricultural and food chemistry.* 2003: 51(17), 5047-5051.

AQUACULTURE

10) REDUCING the potential environmental impact of tank aquaculture effluents through intensification and recirculation. Piedrahita, Raul H. *Aquaculture.* 2003: 226(1-4), 35-44.

BEVERAGES

11) ACTIVITY-guided identification of a chemopreventive compound in coffee beverage using in vitro and in vivo techniques. Somoza, Veronika, *et al. Journal of agricultural and food chemistry.* 2003: 51(23), 6861-6869.
12) FACTORS affecting the levels of tea polyphenols and caffeine in tea leaves. Lin, Yung-Sheng, *et al. Journal of agricultural and food chemistry.* 2003: 51(7), 1864-1873.
13) HIBISCUS sabdariffa extract inhibits the development of atherosclerosis in cholesterol-fed rabbits. Chen, Chang-Che, *et al. Journal of agricultural and food chemistry.* 2003: 51(18), 5472-5477.

BIOTECHNOLOGY

14) BANNING modified crops is not enough to save wildlife. Coghlan, A. *New scientist.* 2003: 180(2417), 8-9.
15) FROM proteomics to structural bio. Henry, C.M. *Chemical engineering news.* 2003: 81(39), 25-30.

CHEMICAL AND CHEMISTRY

16) BIOCONTROL arms race looms. Nowak, R. *New scientist.* 2003: 179(2410), 8-9.
17) BIOSYNTHESIS and metabolism of cyclopropane rings in natural compounds. Wessjohann, Ludger A. and Brandt, Wolfgang. *Chemical reviews.* 2003: 103(4), 1625-1647.
18) EFFECT of molecular chirality on the morphology of biomimetic langmuir monolayers. Nandi, Nilashis and Vollhardt, Dieter. *Chemical reviews.* 2003: 103(10), 4033-4075.
19) FRIEND or foe? Mackenzie, D. *New scientist.* 2003: 179(2411), 36-37.
20) FUELING the chemical industry's future. Harper, Tim, *et al. Chemical engineering progrees.* 2003: 99(11), 34-38.
21) The MANY faces of combinatorial chemistry. Borman, Stu. *Chemical & engineering news.* 2003: 81(43), 45-46, 48, 50-52, 54, 56.
22) NANOSENSORS' niche in nanotechnology. Carrillo, Daniela L. *Chemical engineering progrees.* 2003: 99(11), 43-45.

COMPUTERS AND ELECTRONICS

23) 3DTV as you've never seen it. Flides, J. *New scientist.* 2003: 180(2417), 28-31.
24) ADVANCED chip opens door to free choice of software. Ananthasamy, A. *New scientist.* 2003: 180(2415), 25.
25) ANTIVIRUS strategies in crisis. Graham, D. *New scientist.* 2003: 179(2411), 6-7.
26) MAGIC eyes: They look like simple slabs of rubber. Hecht, Jeff. *New scientist.* 2004: 181(2431), 24-27.
27) MAGNETIC trick breathes new life into MiniDisc. Fox, Barry. *New scientist.* 2004: 181(2431), 20-21.
28) NO one understands me as well as my PC. Brooks, Michael. *New scientist.* 2003: 180(2419), 28-31.
29) REBEL network. O'Brien, D. *New scientist.* 2003: 180(2416), 26-29.
30) RFID: Promise and peril. Machrone, Bill. *PC magazine.* 2003: 22(21), 57.

CONSTRUCTION INDUSTRY

31) ASIAN lions roar once more. High, R. *International construction.* 2003: 42(7), 15-19.
32) TOP 100 contractors. Sleight, C. *International construction.* 2003: 42(6), 15-17.

DAIRY

33) CAPILLARY electrophoresis of a-lactalbumin in milk powders. Gutierrez, Jose E.N. and Jakobovits, Lisa. *Journal of agricultural and food chemistry.* 2003: 51(11), 3280-3286.
34) ED-XRF as a tool for rapid minerals control in milk-based products. Perring, Loic and Andrey, Daniel. *Journal of agricultural and food chemistry.* 2003: 51(15), 4207-4212.
35) INFLUENCE of emulsifying component composition on creams formulated with fractionated milkfat. Scott, Lisa L., *et al. Journal of agricultural and food chemistry.* 2003: 51(20), 5933-5940.
36) MICROENCAPSULATED iron for milk fortification. Kwak, H.S., *et al. Journal of agricultural and food chemistry.* 2003: 51(26), 7770-7774.

ENERGY SOURCES

37) The CLEAN green energy dream. Randerson, J. *New scientist.* 2003: 179(2408), 8-11.
38) ENERGY – related emissions from telework. Kitou, Erasmia and Horvath, Arpad. *Environmental science & technology.* 2003: 37(16), 3467-3475.
39) HAND-held water pumps to power mobile devices. *Chemistry & industry.* 2003: 21, 9.
40) HERE comes the sun. Leggett, J. *New scientist.* 2003: 179(2411), 23.
41) FROM fixed cost to pressing concern. Valero, Greg, *et al. Modern plastics international.* 2003: 33(10), 34-39.
42) FUELS for urban transit buses: A cost-effectiveness analysis. Cohen, Joshua T., *et al. Environmental science & technology.* 2003: 37(8), 1477-1484.
43) NATURAL gas market muddle: Natural gas reserves fill, demand declines, but prices are predicted to stay near record highs. Johnson, Jeff. *Chemical & engineering news.* 2003: 81(42), 20-21.

ENVIRONMENTAL PROTECTION

44) CALIFORNIA trash law could limit plastics use. Valero, Greg. *Modern plactics international.* 2003: 33(10), 31, 52.
45) GLOBAL warming: the new battle. Hogan, J. *New scientist.* 2003: 179(2412), 6-7.
46) LIFE cycle economic and environmental implications of using nanocomposites in automobiles. Llyod, Shannon M. and Lave, Lester B. *Environmental Science & technology.* 2003: 37(15), 3458-3466.
47) REALITY bites for the dream of a hydrogen economy. Ananthaswamy, Anil. *New scientist.* 2003: 180(2421), 6-7.
48) RECYCLED wool-based nonwoven material as an oil sorbent. Radetic, Maja M., *et al. Environmental science & technology.* 2003: 37(5), 1008-1012.
49) REJUVENATING central park: As New York's Central Park approached its 150th birthday, water quality specialists looked for ways to keep its waters healthy. Lenz, Mark, *et al. Water environment & technology.* 2003: 15(9), 50-57.
50) THROW-away culture: Taiwanese ban on plastic bags enrages industry, inspires other countries to take action. Tremblay, Francois. *Chemical & engineering news.* 2003: 81(43), 28.
51) EFFECT of three pharmaceutical and personal care products on natural freshwater algal assemblages. Wilson, Brittan A. *et al. Environmental science & technology.* 2003: 37(9), 1713-1719.
52) STUDIES of some ultratrace elements in antarctic water via crown ether crosslinked chitosan. Zhang, Shu-Qin, *et al. Journal of applied polymer science.* 2003: 90(3), 806-809.

FOOD ADDITIVES

53) CHOOSING new alternatives to alternative ingredients. Pszczola, Donald E. *Food technology.* 2003: 57(10), 54, 56-58, 60, 62, 64-69.

FOOD – FISH AND MARINE PRODUCTS

54) AQUATIC ingredients provide a new wave of opportunity. Pszczola, Donald E. *Food technology.* 2003: 57(5), 71-79.

55) COOKING-freezing-reheating (CFR) of sardine (sardine pilchardus) fillets. Effect of different cooking and reheating procedures on the proximate and fatty acid compositions. Garcia-Arias, M.T., *et al. Food chemistry.* 2003: 83(3), 349-356.

56) DIRECT sequencing method for species identification of canned sardine and sardine-type products. Jerome, Marc, *et al. Journal of agricultural and food chemistry.* 2003: 51(25), 7326-7332.

57) A HIGH price to pay for caviar. Pearce, F. *New scientist.* 2003: 179(2413), 6-7.

FOOD – FRUITS, VEGETABLES AND NUTS

58) ALTERATIONS of vitamin C, total phenolics, and antioxidant capacity as affected by processing tomatoes to different products. Gahler, Susan, *et al. Journal of agricultural and food chemistry.* 2003: 51(27), 7962-7968.

59) CAROTENOID composition of cooked green vegetables from restaurants. de Sa, Marcela C. and Rodriguez-Amaya, Delia B. *Food chemistry.* 2003: 83(4), 595-600.

60) COCOA has more phenolic phytochemicals and a higher antioxidant capacity than teas and red wine. Lee, Ki Won, *et al. Journal of agricultural and food chemistry.* 2003: 51(25), 7292-7295.

61) EDIBLE coatings composed of methylcellulose, stearic acid, and additives to preserve quality of pear wedges. Olivas, Guadalupe I., *et al. Journal of food processing and preservation.* 2003: 27(4), 299-320.

62) The EFFECTS of frozen storage conditions on lycopene stability in watermelon tissue. Fish, Wayne W. and Davis, Angela R. *Journal of agricultural and food chemistry.* 2003: 51(12), 3582-3585.

63) EVALUATION of the antioxidant properties of fruits. Garcia-Alonso, Maria, *et al. Food chemistry.* 2004: 84(1), 13-18.

64) FROM plums to prunes: Influence of drying parameters on polyphenols and antioxidant activity. Piga, Antonio, *et al. Journal of agricultural and food chemistry.* 2003. 51(12), 3675-3681.

65) POLYPENOLS and antioxidant capacity of vegetables under fresh and frozen conditions. Ninfali, Paolino and Bacchiocca, Mara. *Journal of agricultural and food chemistry.* 2003: 51(8), 2222-2226.

66) QUANTITATIVE determination of *b*-carotene stereoisomers in fresh, dried, and solar-dried mangoes (mangifera indica L.). Pott, Isabell, *et al. Journal of agricultural and food chemistry.* 2003: 51(16), 4527-4531.

67) TYROSINASE inhibitory activity of cucumber compounds: Enzymes responsible for browning in cucumber. Gandia-Herrero, Fernando, *et al. Journal of agricultural and food chemistry.* 2003: 51(26), 7764-7769.

FOOD INDUSTRY

68) TOP 10 trends to watch and work on: 2003. Sloan, A. Elizabeth. *Food technology.* 2003: 57(4), 30-32, 34, 36, 38-40, 42-44, 46, 48-50.

69) WHAT consumers want – and don't want – on food and beverage labels. Sloan, A. Elizabeth. *Food technology.* 2003: 57(11), 26-28, 30-32, 34-36.

FOOD – MEAT PRODUCTS

70) PARTICULATE metmyoglobin reducing activity and its relationship with meat color. Bekhit, Alaa El-Din A., *et al. Journal of agricultural and food chemistry.* 2003: 51(20), 6026-6035.

FOOD MICROBIOLOGY

71) DETERMINATION of organophosphorus pesticides in fruit juices by matrix solid-phase dispersion and gas chromatography. Albero, Beatriz, *et al. Journal of agricultural and food chemistry.* 2003: 51(24), 6915-6921.

72) DETERMINATION of ortho-phenylphenol, diphenyl and diphenylamine in apples and oranges using HPLC with fluorescence detection. Bahruddin Saad, *et al. Food chemistry.* 2004: 84(2), 313-317.

73) EFFECT of mild-heat and high-pressure processing on banana pectin methylesterase: A kinetic study. Ly-guyen, Binh, *et al. Journal of agricultural and food chemistry.* 2003: 51(27), 7974-7979.

74) HERB extracts wrap up lethal food bugs. Biever, Celeste. *New scientist.* 2003: 178(2399), 26.

75) INVESTIGATIONS of factors that influence the acrylamide content of heated foodstuffs. Rydberg, Per, *et al. Journal of agricultural and food chemistry.* 2003: 51(24), 7012-7018.

FOOD TECHNOLOGY

76) FORMULATING and manufacturing ice cream and other frozen desserts. Marshall, Robert T. and Goff, Douglas. *Food technology*. 2003: 57(5), 32-34, 36, 38, 40-45.

INDUSTRIAL SAFETY

77) INHERENT security: Protecting process plants against threats. Baybutt, Paul. *Chemical engineering progress.* 2003: 99(12), 35-38.

INFORMATION TECHNOLOGIES

78) CLEVER antennas stay connected: Can't get a signal on your mobile? Graham-Rowe, Duncan. *New scientist.* 2004: 181(2432), 21.

79) FLAWED code leaves phones wide open to eavesdroppers. Sigel-Itzkovitch, J. *New scientist.* 2003: 179(2412), 11.

80) ON technology: No cords, no hassles. Howard, Bill. *PC magazine*. 2004: 23(4), 57

81) WILL we ever know ? Graham, D. *New scientist.* 2003: 179(2412), 12-13.

MACHINERY AND EQUIPMENT

82) HYBRID injection clamps: The best of both worlds? Knights, Mikell. *Plastics technology.* 2003: 49(4), 50-55.

83) LASER sensors in the tire industry. Snow, Mike and Pastorius, Walt. *Rubber world.* 2004: 229(4),18-20.

84) MACHINERY migrates to application technology. Valero, G. *Modern plastics international.* 2003: 33(8), 20-21

85) NEW technology in hose reinforcing machines. Xiang, Wang Wei. *Rubber world.* 2003: 228(4), 22-26.

86) PLASTIC-metal hybrids make headway on and off the road. Leaversuch, Robert. *Plastics technology.* 2003: 49(12), 33-35.

87) REDUCE unplanned shutdowns. Scott, Cindy and Felts, Chris. *Chemical engineering progress.* 2003: 99(9), 40-44.

88) WHAT to look for when selecting a robot. Calomino, Joe. *British plastics & rubber.* 2003: Sep., 16-17.

MANAGEMENT

89) DEVELOP an effective crisis-management strategy. Wilson, Steve. *Chemical engineering progress.* 2003: 99(9), 58-61.

90) HOW less is more: By redesigning, reconfiguring and re-engineering processes, coupled with reducing wastage and pollution, it's possible to use fewer resources to get bigger output. Zinkin, John. *Investors digest.* 2004: Mid - Jan., 41-42, 109.

91) INNOVATING for cash: There are several ways to bring a new product to market. Andrew, James P. and Sirkin,, Harold L. *Harvard business review*. 2003: 81(9), 76-83.

92) The QUEST for resilience: In a turbulent age, the only dependable advantage is a superior capacity for reinventing your business model before circumstances force you to. Hamel, Gary and Valikangas, Liisa. *Harvard business review.* 2003: 81(9), 52-63.

93) TEAM member functional background and involvement in management teams: Direct effects and the moderating role of power centralization. Bunderson, J. Stuart. *The Academy of management journal.* 2003: 46(4), 458-474.

MARKETING AND TRADE

94) TRADE winds: When it comes to China, multinationals go. Moore, Stephen. *Modern plastics international.* 2004: 34(1), 30-31.

MATERIALS ENGINEERING

95) ENGINEERING materials are better to use and better in use. *British plastics & rubber.* 2003: Oct., 4-5.

96) POLYSULPHONE uprates tupperware performance. *British plastics & rubber.* 2003: Sep. 38.

MEDICINAL PLANTS

97) BETTING on natural products for cures: In natural products drug discovery, traditional, as well as novel, approaches are being applied. Rouhi, A. Maureen. *Chemical & engineering news.* 2003: 81(41), 93-94, 96-98, 00-103.

OFFICE AND BUSINESS BUILDING

98) CLIMATE change, insurance and the buildings sector: Technological synergisms between adaptation and mitigation. Mills, Evan. *Building research & information.* 2003: 31(3-4), 257-277.

PACKAGING

99) BOOMING bag trade bites Western processors. Colvin, Robert. *Modern plastics international.* 2004: 34(1), 36.
100) BREAKING into medical films. Schut, Jan H. *Plastics technology.* 2003: 49(11), 48-53.
101) COMPETITION coming for dual- ovenable packs. Defosse, M. *Modern plastics international.* 2003: 33(1), 30-31.
102) DETECTION of aluminium residue in sauces packaged in aluminium pouches. Joshi, S.P., *et al. Food chemistry.* 2003: 83(3), 383-386.
103) ENVIRONMENTALLY friendly barrier coating moves to packaging. Colvin, Robert. *Modern plastics international.* 2003: 33(12), 29.
104) FLEXIBLE packaging looks for competitive edge. Colvin, Robert. *Modern plastics international.* 2004: 34(1), 21.
105) INTEGRATED plastic bottle making/packing systems. Brody, Aaron L. *Food technology.* 2003: 57(10), 83-84.
106) INVESTIGATION of packaging systems for shelled walnuts based on oxygen absorbers. Jensen, Pernille N., *et al. Journal of agricultural and food chemistry.* 2003: 15(17), 4941-4947.
107) PLASMA coating puts PET beer bottles on the map. *British plastics & rubber.* 2003: Oct., 29.
108) The ROLE of packaging film permselectivity in modified atmosphere packaging. Al-Ati, Tareq and Hotchkiss, Joseph H. *Journal of agricultural and food chemistry.* 2003: 51(14), 4133-4138.
109) STAND up and cheer. Brody, Aaron L. *Food technology.* 2003: 57(11), 73-75.
110) A WONDERFUL world for aseptic packaging. Brody, Aaron L. *Food technology.* 2003: 57(5), 92-94.

PAINTS AND COATING

111) PAINTS & coatings: Business has been off this year, but new materials are here – some with astonishing color effects or outstanding preservative qualities. Reisch, Marc S. *Chemical & engineering news.* 2003: 81(44), 23-24.
112) RAINBOW in a can: Take chemistry and physics mix generously, and voila! Paint that glitters and sparkles. Reisch, Marc S. *Chemical & engineering news.* 2003: 81(44), 25-26, 28.

PEST AND PEST CONTROL

113) DEGRADATION of pesticides in biobeds: The effect of concentration and pesticide mixtures. Fogg, Paul *et al. Journal of agricultural and food chemistry.* 2003: 51(18), 5344-5349.
114) MARINE natural products as prototype agrochemical agents. Peng, Jiangnan, *et al. Journal of agricultural and food chemistry.* 2003: 51(8), 2246-2252.

PETROCHEMICALS AND PETROLEUM

115) ASSESSMENT of the disposal of radioactive petroleum industry waste in nonhazardous landfills using risk-based modeling. Smith, Karen P., *et al. Environmental science & technology.* 2003: 37(10), 2060-2066.

PHARMACEUTICALS

116) BIOCHEMICAL modulation of cisplatin mechanisms of action: Enhancement of antitumor activity and circumvention of drug resistance. Fuertes, Miguel A., *et al. Chemical reviews.* 2003: 103(3), 645-662.
117) A BODY repair kit, within hours, from your own blood. Coghlan, Andy. *New scientist.* 2003: 180(2423), 6-7.
118) FORWARD motion: Indian pharmaceutical producers learn how to better compete in international markets. Tremblay, Jean-Francois. *Chemical & engineering news.* 2003: 81(41), 41-42.
119) INTERACTION of a new anesthetic drug richlocain with linear and weakly crosslinked poly-N-vinylpyrrolidone. Makysh, G. Sh., *et al. Journal of applied polymer science.* 2003: 89(11), 2977-2981.
120) REDISCOVERING natural products: Cast aside for years, natural products drug discovery appears to be reclaiming attention and on the verge of a comeback. Rouhi, A. Maureen. *Chemical & engineering news.* 2003: 81(41), 77-78, 80-84, 86, 88-91.
121) WHAT doesn't kill you. Martindale, D. *New scientist.* 2003: 180(2418), 38-41.

PLASTICS AND POLYMERS

122) CONTROLLED synthesis of silicon-containing polymers by metal catalysts. Kawakami, Yusuke, *et al. Polymer international.* 2003: 52(10), 1619-1624.
123) DETERMINATION of potential migrants in polycarbonate containers used for microwave ovens by high-performance liquid chromatography with ultraviolet and fluorescence detection. Nerin, Cristina, *et al. Journal of agricultural and food chemistry.* 2003: 51(19), 5647-5653.

124) EFFECT of adhesive-coated glass fiber in natural rubber (NR), acrylonitrile rubber (NBR), and ethylene-propylene-diene rubber (EPDM) formulations. I. Effect of adhesive-coated glass fiber on the curing and tensile properties of NR, NBR, and EPDM formulations. Rathinasamy, P., *et al. Journal of applied polymer science.* 2004: 91(2), 1111-1123.

125) EFFECTS of diacrylate monomers on the bond strength of polymer concrete to wet substrates. Ahn, Namshik. *Journal of applied polymer science.* 2003: 90(4), 991-1000.

126) ENCHANCED corrosion protection coatings prepared from soluble electronically conductive polypyrrole-clay nanocomposite materials. Yeh, Jui-Ming., *et al. Journal of applied polymer science.* 2003: 88(14), 3279-3283.

127) FORMATION of microcapsules of medicines by the rapid expansion a supercritical solution with a nonsolvent. Matsuyama, K., *et al. Journal of applied polymer science.* 2003: 89(2), 742-752.

128) GLOBAL plastics growth poised for a comeback. *Modern plastics international.* 2003: 33(1), 46-47.

129) H_2O_2 as a modifier as phenol- formaldehyde resin used in the production of particleboards. Czarnecki, R and Lecka, J. *Journal of applied polymer science.* 2003: 88(14), 3084-3092.

130) HIGH-density polyethylene foams. I. Polymer and foam characterization. Zhang, Yaolin, *et al. Journal of applied polymer science.* 2003: 90(8), 2111-2119.

131) HOT runner. Knights, M. *Plastics technologies.* 2003: 49(9), 48-53,67.

132) IMPACT modification of waste PET by polyolefinic elastomer. Chaudhari, K.P. and Kale, D.D. *Polymer international.* 2003: 52(2), 291-298.

133) *IN situ* modulus enhancement of polypropylene monofilament through blending with a liquid-crystalline copolyester. Sukananta, Pakavadee and Bualek-Limcharoen, Sauvarop. *Journal of applied polymer science.* 2003: 90(5), 1337-1346.

134) INFLUENCE of processing and sterilisation on properties of poly-Î-caprolactone. Weir, N.A., *et al. Plastics, rubber and composites.* 2003: 32(6), 265-270.

135) LIQUID-crystalline copolyester/clay nanocomposites. Zhang, Guangli, *et al. Journal of applied polymer science.* 2003: 89(12), 3155-3159.

136) MATERIALS. Leaversuch, R., et al. *Plastics technologies*. 2003: 49(9), 54-59.

137) MECHANICAL and thermal properties of high-density polyethylene toughened with glass beads. Yuan, Qiang, *et al. Journal of applied polymer science.* 2003: 89(8), 2102-2107.

138) MECHANICAL, hygroscopic, and thermal properties of ultrathin polymeric substrates for magnetic tapes. Ma, Tiejun and Bhushan, Bharat. *Journal of applied polymer science.* 2003: 89(11), 3052-3080.

139) MIDDLE earth's monster makers. Murphy, Marina. *Chemistry & industry.* 2003: 24, 10-12.

140) MONOLAYER pet bottles emerge in barrier uses. *Plastics technologies.* 2003: 49(9), 21.

141) NEW polymer uses sunlight to arm itself against UV damage. Naitove, Matthew H. *Plastics technology.* 2004: 50(2), 44-45.

142) NEW polypropylene families for packaging, blends & composites. Sherman, Lilli Manolis. *Plastics technology.* 2003: 49(11), 37-39.

143) OIL palm empty fruit bunch-polyurethane composites: The effect of isocyanate/glycol ratio, glycol type, and glycol mixture on impact strength, dimensional stability, and thermal properties. Rozman, H.D., *et al. Polymer-plastics technology and engineering.* 2003: 42(5), 811-826.

144) OPTIMIZED condition for grafting reaction of poly(butyl acrylate) onto oil palm empty fruit bunch fibre. Ibrahim, N.A., *et al. Polymer international.* 2003: 52(7), 1119-1124.

145) PHSYICAL aging of polymer concrete during creep. Aniskevich, K., *et al*. *Journal of applied polymer science.* 2003: 89(13), 3427-3431.

146) POLY(dimethylsiloxane) coatings for controlled drug release. I. Preparation and characterization of pharmaceutically acceptable materials. Gao, Zongming, *et al. Journal of applied polymer science.* 2003: 90(3), 658-666.

147) PREPARATION and characterisation of biodegradable starch-based nanocomposite materials. McGlashan, Stewart A. and Halley, Peter J. *Polymer international.* 2003: 52(11), 1767-1773.

148) PREPARATION of new polymers from heterocyclic compounds and reactive solvents of melamine. Lubczak, Jacek, *et al. Journal of applied polymer science.* 2003: 90(12), 3390-3401.

149) PRODUCTION, properties and impact toughness of die-drawn toughened polypropylenes. Mohanraj, J., *et al. Polymer engineering and science.* 2003: 43(6), 1317-1336.

150) RAD-CURED plastic coatings move up acceptance ladder. Valero, G. *Modern plastics international.* 2003: 33(1), 24.

151) RHEOLOGICAL and mechanical properties of dynamically cured poly(vinyl chloride)/nitrile butadiene rubber thermoplastic elastomers. Mousa, A., *et al. Polymer international.* 2003: 52(1), 120-125.

152) RICE husk ash filled natural rubber. III. Role of metal oxides in kinetics of sulfur vulcanization. da Costa, H.M., *et al. Journal of applied polymer science.* 2003: 90(6), 1519-1531.

153) SHORT melamine fiber filled nitrile rubber composites. Rajeev, R.S., *et al. Journal of applied polymer science.* 2003: 90(2), 544-558.
154) STRUCTURAL effect of prepared and commercial superplasticizers on performance of cement pastes. Aiad, I. and Hafiz, A.A. *Journal of applied polymer science.* 2003: 90(2), 482-487.
155) A STUDY on cytocompatible poly(chitosan-g-L-lactic acid). Yao, Fanglian, *et al. Polymer*. 2003: 44(21), 6435-6441.
156) SYNTHESIS and characterization of ultraviolet-curable fluorinated polydimethylsiloxanes as ultraviolet-transparent coatings for optical fiber gratings. Colomines, Gael, *et al. Journal of applied polymer science.* 2003: 90(8), 2021-2026.
157) TEMPERATURE dependence of the thermal conductivity and thermal diffusivity of treated oil-palm-fiber-reinforced phenolformaldehyde composites. Singh, Kedar*., et al*. *Journal of applied polymer science.* 2003: 89(13), 3458-3463.
158) THERMOFORMING: Pet is tough to trim. Koester, Larry. *Plastics technology.* 2003: 49(4), 48-49.
159) ULTRAFINE fibers electrospun from biogradable polymers. Zeng, Jing., *et al. Journal of applied polymer science.* 2003: 89(4), 1085-1092.
160) ULTRAVIOLET weathering of photostabilized wood-flour-filled high-density polyethylene composites. Stark, Nicole M. and Matuana, Laurent M. *Journal of applied polymer science.* 2003: 90(10), 2609-2617.
161) USE of binary ethanol/water model solutions to mimic the interaction between a plastic material and pharmaceutical formulations. Jenke, Dennis R., *et al*. *Journal of applied polymer science.* 2003: 89(4), 1049-1057.
162) USE of zinc-neutralized ethylene/methacrylic acid copolymer ionomers as blend compatibilizers for nylon 6 and low-desity polyethylene. Leewajanakul, P., *et al. Journal of applied polymer science.* 2003: 89(2), 620-629.

PUBLIC HEALTH

163) FOOD kills: Remember how to tobacco executives used to question the link between smoking and lung cancers? Wilson, Clare. *New scientist.* 2003: 180(2423), 16.
164) RISK-based approach to evaluate the public health benefit of additional wastewater treatment. Soller, Jeffrey A., *et al. Environmental science & technology.* 2003: 37(9), 1882-1891.

PULP, PAPER AND WOOD INDUSTRIES

165) EFFECT of fillers on curing of wood surfaces with polyester oligomers by ultraviolet radiation. Beg, M.D.H., *et al. Journal of applied polymer science.* 2003: 89(14), 3826-3834.
166) WOOD flour: A new filler for the rubber processing industry. II. Cure characteristic and mechanical properties of NBR compounds filled with corona-treated wood flour. Vladkova, T.G., *et al. Journal of applied polymer science.* 2004: 91(2), 883-889.

RECYCLING

167) 'DRY CLEANING' process recycles contaminated film without water. Schut, J,H. *Plastics technologies.* 2003: 49(9), 45.
168) POLYELECTROLYTES from NS-Novolak production waste. Bajdur, Wioletta M. and Sulkowski, Wieslaw W. *Journal of applied polymer science.* 2003: 89(11), 3000-3005.
169) REGENERATION of carbon black from waste automobile tires. Bhadra, S., et al. *Journal of applied polymer science.* 2003: 89(2), 465-473.
170) SPINNING fibers from poly(ethylene terephthalate) bottle-grade waste. Gurudatt, K., *et al. Journal of applied polymer science.* 2003: 90(13), 3536-3545.

RESEARCH AND DEVELOPMENT

171) COOPERATION is key to do R & D. Storck. W.J. *Chemical engineering news.* 2003: 81(40), 15-16.
172) PATTERNING crystals formed from hydrogel nanoparticles. *Chemical engineering progress.* 2003: 9912), 19-21.

RUBBER

173) COMPATIBILITY study of natural rubber and ethylene-proplene-diene rubber blends. El-Sabbagh, S.H. *Journal of applied polymer science.* 2003: 90(1), 1-11.
174) CRACK growth and abrasion resistance of carbon black-filled purified natural rubber vulcanizates. Rattanasom, N. and Chaikumpollert, O. *Journal of applied polymer science.* 2003: 90(7), 1793-1796.
175) ENHANCEMENT of the chemical resistance of nitrile rubber by direct flourination. Cantu, Yadira-Vega., *et al. Journal of applied polymer science.* 2003: 89(4), 971-979.

176) HYDROPHILISATION of silicone rubber for medical applications. Hron, Petr. *Polymer international.* 2003: 52(9), 1531-1539.
177) *IN situ* epoxidized natural rubber: Improved oil resistance of natural rubber. Tanrattanakul, Varaporn, *et al. Journal of applied polymer science.* 2003: 90(1), 261-269.
178) LSR sponge having open cell structure. Sekiguchi, Susumu, *et al. Rubber world.* 2003: 228(3), 26-29.
179) MELT-compounded natural rubber nanocomposites with pristine and organophilic layered silicates of natural and synthetic origin. Varghese, Siby and Karger-Kocsis, J. *Journal of applied polymer science.* 2004: 91(2), 813-819.
180) NEW reinforcing materials for rising tire performance demands. Luginsland, Hans-Detlef and Niedermeier, Werner. *Rubber world.* 2003: 228(6),34-42, 44-45.
181) An OVERVIEW of silicone rubber. Hamilton, James R. II. *Rubber world.* 2003: 228(3), 31-32, 34-36.
182) ROLE of short polyisoprene chains in storage hardening of natural rubber. Ngolemasango, F., *et al. Polymer international.* 2003: 52(8), 1365-1369.
183) SCRAP tyres are becoming an increasingly valuable commodity. *British plastics & rubber.* 2003: Nov., 30-31.
184) STRUCTURE and properties of EVM reinforced by in situ prepared sodium methacrylate. Du, Aihua, *et al. Rubber world.* 2003: 229(1), 33-34, 36-38, 40-42.
185) STUDIES on novel binary accelerator system in sulfur vulcanization of natural rubber. Marykutty, C.V., *et al. Journal of applied polymer science.* 2003: 90(12), 3173-3182.
186) STUDY on the thermoplastic vulcanizate using ultrasonically treated rubber powder. Kim, Jin Kuk, *et al. Journal of applied polymer science.* 2003: 90(9), 2503-2507.
187) THERMAL stability and kinetics analysis of rubber-modified epoxy resin by high-resolution thermogravimetric. Gu, Aijuan., *et al. Journal of applied polymer science.* 2003: 89(13), 3594-3600.
188) TOUGHNESS and morphology of radiation-crosslinked natural rubber modified polystyrene. Aiamsen, P. *et al. Polymer international.* 2003: 52(7), 1198-1202.
189) VULCANIZATION kinetics of natural rubber-organoclay nanocomposites. Lopez-Manchado, M.A., *et al. Journal of applied polymer science.* 2003: 89(1), 1-15.

SOYBEAN AND SOYBEAN PRODUCTS

190) CHEMICAL and nutritional characteristics of United States soybeans and soybean meals. Grieshop, Christine M., *et al. Journal of agricultural and food chemistry.* 2003: 51(26), 7684-7691.
191) EFFECT of calcium sulfate concentration in soymilk on the microstructure of firm tofu and the protein constitutions in tofu whey. Kao, Fuh-Juin, *et al. Journal of agricultural and food chemistry.* 2003: 51(21), 6211-6216.
192) A SEMI-pilot-scale procedure for isolating and purifying soybean (glycine max) lectin. Fasina, Yewande O., *et al. Journal of agricultural and food chemistry.* 2003: 51(16), 4532-4538.

SUGAR AND SWEETNESS

193) MOLECULAR mobility and the perceived sweetness of sucrose, fructose, and glucose solutions. Mahawanich, T. and Schmidt, S.J. *Food chemistry.* 2004: 84(2), 169-179.
194) SWEETENER + sweetener enhances the equation. Pszczola, Donald E. *Food technology.* 2003: 57(11), 48, 50-52, 54-61.

TEXTILE INDUSTRY

195) DURABLE and regenerable antimicrobial textiles: Synthesis and applications of 3-methylol-2,2,5,5-tetramethyl-imidazolidin-4-one (MTMIO). Qian, Lei and Sun, Gang. *Journal of applied polymer science.* 2003: 89(9), 2418-2425.
196) POLYACRYLAMIDE/guar gum adduct as a new thickener for reactive printing of wool and nylon-6. Ibrahim, N.A., *et al. Polymer-plastics technology and engineering.* 2003: 42(5), 757-777.

WATER RESOURCES

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