



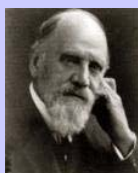
SciTech in Brief

Information Services Centre, No. 363, Bauddhaloka Mw., Colombo 07.

Science Quote

In Science the credit goes to the man who convinces the world, not to the man to whom the idea first occurs.

Sir Francis Darwin (1848-1925, English botanist, son of Charles Darwin)



SKYROCKETING SALES OF CARBON-LABELED GOODS

In UK sales of products carrying labels that show the goods' carbon footprint are set to pass £2bn a year, say the scheme's operators. The Carbon Trust, which oversees the accreditation programme, says nine out of 10 UK households bought a carbon-labeled product in the past 12 months. Launched in 2007, the scheme covers more than 90 brands and 5,000 products, including pasta, bread and shampoo.

individually produce and has units of tonnes (or kg) of carbon dioxide equivalent.

A carbon footprint is made up of the sum of two parts, the primary footprint and the secondary footprint.

The *primary footprint* is a measure of our direct

of products we use - those associated with their manufacture and eventual breakdown. To put it very simply – the more we buy the more emissions will be caused on our behalf.

Products that are allowed to carry the footprint symbol have to commit to reducing their carbon emissions over a two-year

period, or risk being thrown out of the scheme. The trust says every stage of a product's lifecycle is assessed, from raw materials and packaging, to manufacture, transportation, sale to the end user, use and disposal. The audit process is underpinned by a standard, known

as PAS 2050 which allows UK firms to measure the size of their goods' carbon footprints, and managed by BSI British Standards that is designed to offer a consistent assessment of the associated energy use and greenhouse gas emissions.

A carbon footprint is a measure of the impact our activities have on the environment, and in particular climate change. It relates to the amount of greenhouse gases produced in our day-to-day lives through burning fossil fuels for electricity, heating and transportation etc.

emissions of CO₂ from the burning of fossil fuels including domestic energy consumption and transportation (e.g. car and plane). We have direct control of these.

The *secondary footprint* is a measure of the indirect CO₂ emissions from the whole lifecycle

The carbon footprint is a measurement of all greenhouse gases we



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www.bbc.co.uk

www.carbonfootprint.com

FINDING *E. COLI* IN BEEF FASTER

Infrared spectroscopy can detect *E. coli* faster than current testing methods and can cut days off investigations of outbreaks, according to a study performed at Purdue University.

Lisa Mauer, an associate Professor of Food Science, detected *E. coli* in ground beef in 1 h using FT-IR spectroscopy, much less than the 48 h required for conventional plating technology, which requires culturing cells in a laboratory. The spectroscopy method also differentiates between strains of *E. coli* 0157:H7, meaning that outbreaks may be tracked more effectively and quickly. Current tests are multistep and take almost a week to get results.

She demonstrated two methods for separating bacteria from ground beef for testing. An antibody-capture method, which

binds bacteria to antibodies attached to magnetic beads, gave results in 4 h. A filtration method achieved results in about 1 h. IR spectroscopy could detect as little as one *E. coli* cell if the bacteria were cultured for 6 hours. Conventional plating techniques used for *E. coli* detection require culturing cells for 48 h.

E. coli has a specific IR spectrum that can be read with a FT-IR spectrometer. IR light is passed over a sample. The spectrometer reads the spectrum created by the combination of energy that has been absorbed and energy that has been reflected back.

People become infected after ingesting food contaminated with the bacteria, which comes from human or animal feces. Symptoms include severe

stomach cramps, diarrhea and vomiting, and in rare occasions the infection can be life-threatening.

This testing method also can differentiate between living and dead *E. coli* cells, something current testing methods cannot. This is also important as the dead population tells something about the quality of the product.

Mauer believes that the ground beef tests show promise for using the technology to find other pathogens in additional types of foods. She has already shown that spectroscopy can detect melamine down to one part per million in powdered baby formula.

www.photonics.com
www.purdue.edu

CONDUCTIVE COATINGS PROVIDE A CLEAR ALTERNATIVE TO MESH WINDOWS

As large LCDs have become an increasingly popular choice of user interface, particularly on portable electronics equipment such as medical devices use shielded windows to manage electromagnetic interference (EMI) issues.

Many shielded windows comprise an acrylic, polycarbonate, polyester or glass substrate material encasing a conductive mesh. Although this achieves high EMI attenuation, it blocks illumination from the display backlight and can impair the readability of the display. This can be particularly problematic in outdoor or other high ambient light environments. Now, in place of the conductive mesh, electronics developers can use a transparent conductive coating such as indium-tin oxide (ITO) on the glass, which doesn't inhibit the light transmission. This is done by using a one-piece, lightweight window that has a transparent conductive coating. Where moderate levels of shielding effectiveness are required, this approach provides an alternative solution that has minimal effect on light transmission.

The surface resistance of the ITO coating is a key parameter governing shielding effectiveness. A thin coating is desirable to maximize light transmittance; on the other hand, increasing the coating thickness increases conductivity and hence improves the window's shielding properties. For most applications, windows having ITO surface resistance in the region of 12 Ohms/sq provide an optimal balance between shielding effectiveness and optical performance.

Globalspec Direct U2 The world of coating and surface engineering, Oct 08, 2010; www.engineerlive.com

NANO-RULERS TO MEASURE NANOSCALE STRUCTURES

With the advent of nanometer-sized machines, there is considerable demand for stable, precise tools to measure absolute distances and distance changes. One way to do this is with a plasmon ruler. A "plasmon" is the quasiparticle resulting from the quantization of plasma oscillation; it's essentially the collective oscillations of the free electron gas at a metallic surface, often at optical frequencies.

A noble metallic dimer (a molecule that results from combining two entities of the same species) has been used as a plasmon ruler to make absolute distance and distance change measurements.

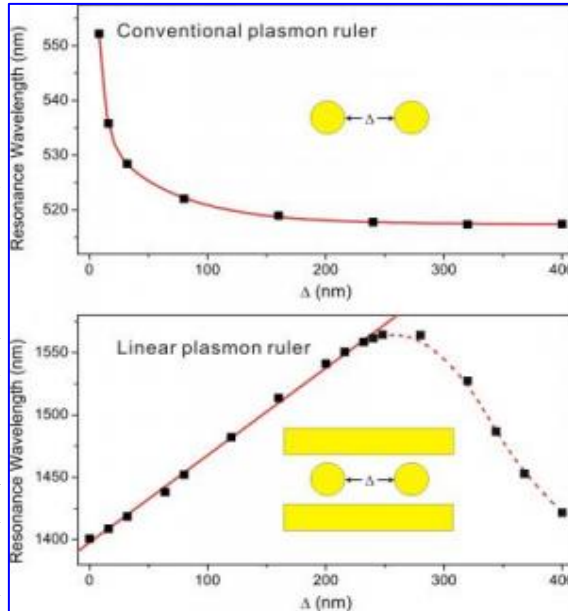
Physicists at China's Wuhan University discovered that nanospheres combined with a nanorod dimer could be used to solve the problem of measurement sensitivity. Shao-Ding Liu and Mu-Tian Cheng used a nanostructure as a linear plasmon ruler. Nanospheres were

used to modify surface plasmon coupling of a nanorod dimer.

increasing of a nanosphere's interparticle separations, resulting in a structure that's useful as a plasmon ruler with homogenous measurement sensitivity.

A nanoparticle dimer plasmon ruler possesses many advantages because its measurement sensitivity is homogeneous, it can operate in the near-infrared region, and the structure's size and nanorod aspect ratio can be modified freely to get the desired measurement range and sensitivity.

Applications for the linear plasmon ruler extend beyond studies of optical properties of metallic nanostructures to single-molecule microscopy, surface-enhanced Raman spectroscopy, waveguiding and biosensing.



In contrast to a conventional nanoparticle dimer plasmon ruler, this new one shows an approximately linear relationship between the resonance wavelength shifts and nanosphere dimer interparticle separation for a linear plasmon ruler. (Credit: Image courtesy of American Institute of Physics)

They found that the resonance wavelength shift increases approximately linearly with the

www.sciencedaily.com

Make a difference

Can one person slow global warming? Sure you; along with scientists, businesses and governments can create paths to cut carbon emissions.

**Open a window instead of running an AC.
When using an AC insulate walls and ceilings.**

Time April 9th, 2007
Cartoon: aecwhazzup.ning.com



COCONUT OIL: GOOD OR BAD?

General perception in the society about saturated fats is negative and is said to be bad for health. Further, a lot of confusion and contradictory evidence exists on the subject of saturated fats, even among health care professionals.

The fact is all saturated fats are not created equal; some occur naturally, while others are artificially manipulated into saturated state through hydrogenation. Medical and scientific communities are now fairly united in the opinion that hydrogenated vegetable and seed oils should be avoided. Unfortunately, this rightful vilification of hydrogenated saturated fats has created a lot of confusion regarding naturally occurring saturated fats, including coconut oil.

Secret Ingredient - Naturally occurring saturated fat in coconut oil has some health benefits, such as promoting health of heart, supporting health of immune system, providing with an immediate energy source, keeping skin youthful looking and supporting the proper functioning of the thyroid. Fifty percent of the fat content in coconut oil is a fat rarely found in nature called lauric acid. Lauric acid a "miracle" ingredient with unique health promoting properties. The body converts lauric acid into monolaurin, which has anti-viral, anti-bacterial and anti-protozoa properties. Monolaurin can actually destroy lipid coated viruses such as HIV, herpes, measles, influenza virus, various pathogenic bacteria and protozoa.

Capric, another fatty acid present in smaller amounts, has also been added to the list of coconut's antimicrobial components.

MCFAs - Coconut oil is about 2/3 medium-chain fatty acids / medium-chain triglycerides (MCFAs/ MCTs). These types of fatty acids produce a whole host of health benefits.

Coconut oil is nature's richest source of these healthy MCFAs. By contrast, most common vegetable or seed oils

are comprised of long chain fatty acids / triglycerides (LCFAs / LCTs), LCFs are not healthy as MCFs found in coconut oil.

Fights Diabetes - MCFAs can supply instant energy. This makes coconut oil a powerful source of instant energy, a function usually served by simple carbohydrates. Although coconut oil and simple carbohydrates share the ability to deliver quick energy, they differ in one crucial respect. Former does not spike insulin. Diabetics and those with pre-diabetes conditions should immediately realize the benefit of a fast acting energy source that doesn't produce an insulin spike in your body. In fact, coconut oil added to the diets of diabetics and pre-diabetics has actually been shown to help stabilize weight gain, which can dramatically decrease your likelihood of getting adult onset type-2 Diabetes.

Good for Athletes and Dieters - One of the best benefits of coconut oil lies in its ability to stimulate metabolism. Many animal and human research have demonstrated that replacing LCFAs with MCFAs results in both decreased body weight and reduced fat deposition. Several studies have now shown that MCFAs can enhance physical or athletic performance.

Additionally, research has demonstrated that, due to its metabolic effect, coconut oil increases the activity of the thyroid. A sluggish thyroid is a reason that some people are unable to lose weight.

Good for the Skin - Coconut oil has been used for decades by massage therapists to knead away tight stressed muscles. Coconut oil helps protect skin from the aging effects of free radicals, and can help improve the appearance of skin with its anti-aging benefits. Coconut oil is considered to be an antioxidant, due to its stability and resistance to

oxidation and free radical formation. It reduces the need for the antioxidant protection of vitamin E.

When coconut oil is absorbed into your skin and connective tissues, it helps to reduce the appearance of fine lines and wrinkles by helping to keep your connective tissues strong and supple, and aids in exfoliating the outer layer of dead skin cells, making your skin smoother.

For the Heart - Heart disease is becoming one of the major causes of death around the world. The first sign of cardiovascular disease is commonly a heart attack, and sadly over 1/3 of heart attacks are fatal.

Primarily unsaturated fats are involved in heart disease, not the naturally occurring saturated fats. Also the polyunsaturated fats in vegetable and seed oils encourage the formation of blood clots by increasing platelet stickiness. Coconut oil helps to promote normal platelet function.

The MCFAs in coconut oil are considered so nutritious that they are used in baby formulas, in hospitals to feed the critically ill, those on tube feeding, and those with digestive problems. Coconut oil has even been used successfully by doctors in treating aluminum poisoning.

Coconut oil is exceptionally helpful for pregnant women, nursing moms, the elderly, those concerned about digestive health, and who just want to enhance your overall health.

<http://articles.mercola.com/sites/articles/archive/2010/10/22/coconut-oil-and-saturated-fats-can-make-you-healthy.aspx>

NEW SELF-DESTRUCTING PLASTIC

A novel polymer that breaks down in response to certain chemical triggers could be the key to developing self-destructing plastic bags. Plastics have gained reputation as an environmental menace as some can take hundreds of years to biodegrade.

Two scientists from the Pennsylvania State University have developed a self-destructing plastic that could lead to more environmental-friendly products. Working with the polymer poly (phthalaldehyde) they attached one of two chemical end groups or “triggers”, either a silyl ether

or an alyl ether, to each phthalaldehyde building block.

When a square of the polymer was exposed at room temperature to fluoride ions, the central section, where molecules were capped with the silyl ether, underwent rapid depolymerisation and



Plastics: environmental menace

broke down. Those sections capped with the alyl ether remain unchanged. They also have produced polymers with end groups that react with hydrogen peroxide and palladium. Ultimately they hope to develop polymers that respond to a wide variety of polymers. This also could be the basis for a low energy method for recycling plastic waste. The technique could eventually give rise to plastic that could degrade quickly when exposed to chemicals in the environment.

New Scientist 3rd July 2010

Image: projectmidori.com

New Additions

Methods in Biotechnology
Schmauder, H. (ed.)

Taylor and Francis
UK

Acc. No. 39962

Handbook of Plant
Biotechnology (Vol. 1 & 2)

Christou, P. & Klee, H. (eds.)

Wiley, India

Acc. No. 39960, 39961

LabView for Everyone

Travis, J. & Kring, J.

Pearson Education

Acc. No. 39940

A Guide to Marine
Plankton: Gulf of Mannar &
Palk Strait, Sri Lanka

Jayasiri, H. B.
NARA

Acc. No. 39950

Energy Management Guide,
Version 1

Sri Lanka Sustainable Energy
Authority

Acc. No. 39930

Handbook of Seed Science &
Technology

Basra, A. S. (ed.)

Food Product Press
India

Acc. No. 39942

FIGHTING SALMONELLA INFECTION

Global food and feed safety company Anitox has conducted a worldwide survey into Salmonella, bacteria and mould levels in animal feed stuffs/ feed ingredients. This identified a number of microbial contaminants including Salmonella, which was found in 36% of complete feed products, although levels in individual ingredients were often much higher. This survey led Anitox to develop Termin-8, a pathogen control programme for finished feed and raw materials, which provided manufacturer with a world-class application/ support programme and producers with the reassurance that the compound feed that they purchased from them was safe.

This formaldehyde based biocide provides control of both gram negative bacteria such as Salmonella and E. coli together with gram positive bacteria such as Staphylococcus and Streptococcus. Spore forming bacteria like Clostridium and mould in feed and feed ingredients are controlled as well.

Pig Progress 26 (1): 19, 2010

ANTIOXIDANTS MAY IMPROVE BREAD QUALITY

The quality and shelf life of whole grain bread may be improved by reducing oxidation during storage, according to new research that shows the potential of antioxidant ingredients.



The study measured the oxidative stability of whole grain bread by monitoring levels of antioxidants, oxidation products, and using a sensory analysis. The researchers found that small, but significant changes occur in bread during storage, that may lead to the development of off flavours and odours – and that these changes may be avoidable through a reduction in or prevention of lipid oxidation. As stated by the researcher at the University of Copenhagen and Aarhus University, Denmark, the ability to delay or even prevent lipid oxidation in bread with extended shelf life would entail an improvement in flavour stability and an enhancement in consumer satisfaction.

The oxidation of unsaturated fatty acids yields a complex mixture of volatile compounds that significantly affects sensory properties of foods even when present in low quantities. Previous research has shown such compounds lead to changes in aroma, flavour and taste occur during storage of whole wheat bread. The stability of whole wheat flour and bread is affected by the balance between lipid composition and the presence of different antioxidants. The researchers stated that the characterisation of early oxidative changes occurring during storage should be valuable for the understanding of quality changes for such products, and may provide a tool for shelf life prediction of bread products.

However, they noted that a thorough study of the oxidative stability of bread during extended storage has, until now, not been reported. The researchers reported that oxidative changes occur in both crumb and crust during extended storage.

The oxidative changes in the whole wheat bread were found to be relatively minor, but were significant enough to cause changes to flavour and odour, with attributes characterising the stored bread reported as ‘aged’, ‘dusty’, ‘rancid’, ‘sickly sweet’, and ‘bitter’.

The content of lipid hydroperoxides – a primary oxidation product – was found to be significantly higher in stored bread crumb compared to bread crust, and reached a maximum peak after 2-3 weeks of storage. Subsequently, the researchers found a decrease in lipid hydroperoxides after 4 and 5 weeks of storage, which they said indicates that the formation of secondary oxidation products was larger than the production of primary oxidation products.

Researcher and the co-workers said bread can be regarded as a product with a relatively high oxidative stability. Despite the high stability the present study clearly showed that oxidative changes occurred in both crumb and crust of whole wheat bread as a consequence of extended storage at room temperature.

<http://www.bakeryandsnacks.com/>

Image: news.softpedia.com

Events

Nanotech Insight

Location: Cairo, Egypt

Date: 27 February - 2 March 2011

Organisation: SabryCorp Ltd. for Science and Development

This series of conferences aims to integrate the scientific and sociological aspects of nanoscience and technology with lasting relationships between industry and academe, and between scientists, technologists and legislators in the developed and developing areas of the planet.

Registration details

Early bird registration deadline: 25 January 2011

Regular registration deadline: 25 February 2011

Contact Details

Email: neveen.samy@sabrycorp.com

1st International Conference on Clean Energy

Location: Dalian, China

Date: 10 - 13 April 2011

Organisation: Royal Society of Chemistry

The search for sources of clean energy is becoming evermore urgent as the supply of available energy from fossil fuels decreases and concerns increase about their environmental impact. Alternative sources of clean energy, such as solar energy and biofuels offer great potential; however there are big challenges to be overcome before current clean energy generation and energy storage technologies make these a viable alternative.

This 1st International Conference on Clean Energy offers a unique opportunity for international researchers to discuss the latest developments in clean energy and energy storage research, and the fundamental issues surrounding the scientific challenges faced ahead.

Key objectives

Themes:

- The conversion of solar energy into chemical fuel, ie water splitting, CO₂ reduction
- The conversion of solar energy into electricity / solar cells
- The storage of solar energy
- Accessing solar energy from natural sources - biofuels
- CO₂ utilisation and storage

Materials for energy storage # New technologies in clean energy

For more information: <http://www.icce.cas.cn:8080/icce/>

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