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Communications to Editor through E-mail :

jiltaeditor@gmail.com; admin@iltaonleather.org

Cover Designed & Printed by :

M/s TAS Associate

11, Priya Nath Dey Lane, Kolkata - 700 036

Published & Printed by :

S. D. Set, on behalf of Indian Leather Technologists' Association

Published from :

Regd. Office : 'Sanjoy Bhavan', 44, Shanti Pally
3rd Floor, Kasba, Kolkata - 700 107

Printed at :

M/s TAS Associate

11, Priya Nath Dey Lane, Kolkata - 700 036

Subscription :

Annual	Rs.(INR)	400.00
Foreign	\$ (USD)	45.00
Single Copy	Rs.(INR)	50.00
Foreign	\$ (USD)	4.00

All other business communications should be sent to :

Indian Leather Technologists' Association
'Sanjoy Bhavan', 3rd floor, 44, Shanti Pally
Kasba, Kolkata - 700 107, WB, India

Phone : 91-33-2441-3429/3459

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mailto:ilta@rediffmail.com

Web site : www.iltaonleather.org

Opinions expressed by the authors of contributions published in the Journal are not necessarily those of the Association

JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

Indian Leather Technologists' Association is a premier organisation of its kind in India was established in 1950 by Late Prof. B.M.Das. It is a Member Society of International Union of Leather Technologists & Chemists Societies (IULTCS).

The Journal of Indian Leather Technologists' Association (JILTA) is a monthly publication which encapsulates latest state of the art in processing technology of leather and its products, commerce and economics, research & development, news & views of the industry etc. It reaches to the Leather / Footwear Technologists and the decision makers all over the country and overseas.

Advertisement Tariff

Full Page / per month

Black & White	Rs. 5,000.00/-
Colour (full page)	Rs. 10,000.00/-
Colour Insert (One side) (Provided by the Advertisers)	Rs. 5,000.00/-

Full Page / per anum

Front inside (2 nd Cover)	Rs. 96,000/-
3 rd Cover	Rs. 84,000/-
Back Cover	Rs. 1,20,000/-

Mechanical Specification

Overall size	: 27 cm × 21 cm
Print area	: 25 cm × 17 cm

Payment should be made by A/c. Payee Cheque to be drawn in favour of :

Indian Leather Technologists' Association
and Payable at **Kolkata**

Send your enquiries to :

Indian Leather Technologists' Association
'SANJOY BHAVAN'
3rd floor, 44, Shanti Pally, Kasba, Kolkata – 700 107
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Commodities – based market lead price gains in Q1



Broad-based price gains were seen across commodity markets in Q1 2017, as prices continued to recover from 2015 and 2016's lows. The Focus Economics global commodity price index came in at 74.7 in Q1, above Q4 2016's 71.6. According to Focus Economics' calculations, global commodity prices grew 4.4% at the start of the year from Q4 and were up 23.5% on an annual basis. As a result, prices are now resting at the highest level since Q2 2015.

Behind Q1's result was strong impetus from energy prices, which are notably above last year's levels. The deal between OPEC and non-OPEC producers has helped curb production and energy prices averaged a near two-year high in Q1. In addition, an improving global economy **boosted base metal prices and moderate gains were also seen among precious metals and agricultural commodities.**

After languishing at low levels in 2015 and 2016, the rebalancing of the energy market is on track midway through the year and economic analysts see prices recovering lost ground in H2. In Q4 2017, panellists see the Focus Economics energy price index averaging 102.3, which if confirmed, would be the highest level seen since Q4 2014. In addition, it would represent a 12.0% expansion over Q4 2016. In 2018, panellists see the index rising further to 108.9.

Behind the forecast are higher oil prices, which are expected to rise even further due to supply cuts. While an initial six-month deal to cut production among OPEC and non-OPEC nations is set to expire in June, analysts are confident that it will be extended and in May, energy ministers from Saudi Arabia and Russia, stated that production cuts should be prolonged until 2018. Ministers from OPEC and non-OPEC countries will meet on 25 May to discuss the agreement.

On top of oil, Focus Economics analysts see uranium prices ending the year on a better note. However, coking and thermal coal prices are seen falling in H2 and ending 2017 at a lower level than a year earlier. Natural gas will average slightly higher in Q4 2017 compared to a year before.

In the past weeks, the price of Brent Crude Oil, the global benchmark, has been dominated by a tug of war

between OPEC seeking to staunch supply and the U.S. shale industry ramping up production, encouraged by the recovery in prices. The standoff has left the price in a tight range. On 7 April, Brent Crude Oil prices traded at USD 54.3 per barrel, which was 0.3% lower than on the same day in March. The benchmark price for global crude oil markets was down 1.7% on a year-to-date basis, but still was 45.2% higher than on the same day last year. Skepticism that OPEC cuts will rebalance the global oil markets is growing as inventory draws have been limited in Q1 2017. This has been the key reason for weakness in the past month. Consequently, Brent prices averaged USD 53.7 per barrel in Q1, virtually in line with our Consensus forecast, which had the price averaging USD 54.0 per barrel. That said, there are indications that the market rebalancing is well and truly underway. Tanker data for Q1 indicate that OPEC exports have fallen by more than 1.3 million barrels per day compared to the previous quarter and refinery activity accelerated in the same period. The fact is that the summer coming driving season in the U.S. is expected to boost demand and to drive prices higher. Nevertheless, the latest data from the EIA showed that U.S. inventories continued to grow at the beginning of April.

An improving global economy is seen putting upward pressure on base metals prices and analysts see the base metal price index averaging 65.2 in Q4, which represents a 4.5% annual increase from Q4 2016. In Q4 2018, the index is seen rising slightly to 65.4.

After soaring in the first quarter of the year, aluminium prices are seen continuing to rise on an annual basis in the remainder of the year although at a cooler pace. Supply constraints are fuelling increasing prices, although concerns over China's economy continue to hurt investor sentiment. The positive momentum in copper prices is also expected to wane, although prices are still seen ending the year 7.1% above Q4 2016's level due to tighter supply and a dynamic U.S. economy. Meanwhile, prices for iron ore have plunged since the start of the year but economic analysts see a slight pick-up from current levels by year-end.

Investment and manufacturing led growth momentum to strengthen in Q1. Although continued investment-fuelled



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Editorial

growth casts some doubts on the quality of China's economic rebalancing, certain details from Q1 suggest that the country's economic transition toward more sustainable levels remains intact. Private companies were behind the recovery in nominal investment, while dynamics in the service sector remained strong. A recovery in global demand, coupled with an improved domestic economic outlook, caused manufacturing output to strengthen sharply. Despite fears of an increase in trade protectionism, exports expanded for the first time in two years. Moreover, April's talks between Donald Trump and Xi Jinping have alleviated fears of an open trade war between the world's two largest economies.

GDP grew a meager 0.7% in Q1 according to recent data, confirming earlier signs that the U.S. economy had experienced a bumpy ride at the outset of the year. Nonetheless, with the weakness of the reading largely attributable to a downswing in inventories and seasonal and one-off factors, there is little reason to think the U.S. economy is petering out. Indeed, subdued household spending—particularly in the automotive sector—mostly reflected payback for breakneck growth in the latter half of 2016, while feeble growth in utilities consumption mainly highlighted the mildness of this year's winter. Heading into Q2, private consumption is expected to show more resilience, building on upbeat sentiment and an outstandingly robust labour market.

Events in the precious metal market will be dominated by the outlook for U.S. interest rates as well as global uncertainty. Analysts see the Focus Economics precious metal index averaging 187.8 in Q4, which is only 0.4% above Q4 2016's level. While elevated political uncertainty is fuelling demand for gold and silver as safe-haven assets, a higher interest rate forecast for the U.S. is eroding gold and silver's appeal as investments. In Q4 2018, the index is seen averaging higher at 193.2.

Meanwhile, a stronger global economy is supporting demand for palladium and platinum for their industrial uses. Palladium prices have surged in 2017 so far, buoyed by robust car sale data. While platinum has seen more moderate gains this year, a supply deficit is supporting a higher price outlook.

A mix of weather, demand and politics is convoluting the outlook for agricultural commodities and economic experts hold divergent views across goods. Overall, the Focus Economics agricultural commodities index is seen averaging 122.0 in Q4 2017, which is 5.0% higher than the same quarter last year. In 2018, the index is seen increasing slightly and averaging 124.3 in Q4.

Corn prices are seen rising substantially, partly due to a shift away from corn production by U.S. farmers. A fall in output and healthy consumption should support higher wheat prices, and the price of milk is also seen notably above 2016's level in Q4. On the other hand, healthy supply has led Focus Economics analysts to project lower prices for cocoa compared to Q4 2016 as well as for soybeans and sugar.

Looking forward, Focus Economics analysts expect momentum to recede throughout the second quarter and see prices growing a moderate 0.3% from Q1. While dynamics from the energy market should remain solid, a poorer performance from base and precious metals will limit gains. Tightening liquidity in China, as well as concerns over the country's growth, is denting base metal prices, while an expected hike in U.S. interest rates is eroding the appeal of precious metals.

Goutam Mukherjee

Dr. Goutam Mukherjee
Hony. Editor, JILTA

From the Desk of General Secretary



67TH FOUNDATION DAY CELEBRATION OF ILTA

This will be organized on Monday the 14th August ' 2017 at 11.00 hrs.

As you are kindly aware, on this occasion we felicitate the toppers in B.Tech and M.Tech Leather Technology Examinations of West Bengal University of Technology and of Anna University with B. M. Das Memorial Medals. Topper in B.Tech Leather Technology Examination from West Bengal University of Technology also receives J. M. Dey Memorial Medal.

Both the Principals, Govt. College of Engineering & Leather Technology, Kolkata and the Honorary Faculty, Dept. of Leather Technology, Anna University, Chennai have been requested to provide details in respect of the toppers of this year so that they can be invited to the Foundation Day Ceremony to receive the awards in person.

J. Sinha Roy Memorial Award will also be presented on this occasion to the Author (s) of the article published in JILTA during 2016 adjudged the Best.

We are planning to organize the celebration programme at the Auditorium of Freya Design Studio, ILPA Leather Goods Park, Bantala, 24 Pgs. (South) with participation of entire leather industry & our members. CSIR – CLRI, GCELT, CLCTA, ILPA & CLE will be approached to participate in this auspicious occasion.

Confirmed programme details will be communicated to you well in advance.

RECONSTITUTION OF EXECUTIVE COMMITTEE OF ILTA FOR THE TERM 2017-2019

The Executive Committee of ILTA at its 498th Meeting held on 14.03.2017 approved the following schedule for Election of Executive Committee of ILTA and the Regional Committees for the term 2017 – 2019.

Mr. Dhiman Chakraborty, Controller of Finance, The Asiatic Society, Ministry of Culture, Govt. of India has kindly consented to act as the Returning Officer for the Election to reconstitute the Executive Committee of ILTA for the term 2017 – 2019.

ELECTION SCHEDULE FOR RECONSTITUTION OF EXECUTIVE COMMITTEE OF ILTA FOR THE TERM 2017- 2019 :

Sl. No.	Events	Election Schedule 2017-2019	Day
01	Mailing of Nomination papers & Voters' List on or before	04.05.2017	Thursday
02	Last date for receipt of Nomination Papers	26.05.2017	Friday
03	Last date for receipt of Consent	15.06.2017	Thursday
04	Last date for withdrawal of candidature	19.06.2017	Monday
05	Mailing of ballot papers on or before	08.07.2017	Saturday
06	Last date for receipt of ballot papers From voters residing outside KMDA area & 24-Pgs (N & S)	05.08.2017	Saturday
07	Casting of votes by voters residing in KMDA & 24-Pgs (N & S) Area at ILTA Administrative Office 10-00 to 17-00 hrs. LUNCH BREAK : 1-30 to 2-30 PM	04.08.2017 & 05.08.2017	Friday & Saturday
08	Counting of votes at ILTA Administrative Office from 11-00 hrs. onwards	07.08.2017	Monday

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- b) Kindly mention your **Membership No. (if any)** against your each and every communication, so that we can locate you easily in our record.



(Susanta Mallick)
General Secretary

**Executive Committee Members meet every Thursday
at 18-30 hrs. at ILTA Office.
Members willing to participate are most welcome.**





USE OF SPECTROPHOTOMETER FOR COLOUR MATCHING IN LEATHER

Aniruddha Purkait¹, Goutam Mukherjee²

1, 2. Govt. College of Engg. & Leather Technology

ABSTRACT :

Colour measurements are methods of expressing the colours sensed by humans as value. Colour measurements require a wavelength range from 380 nm to 780 nm, which is equivalent to the wavelengths that can be sensed by the human eye. Colour measurements can be made by calculations based on spectral reflectance measurements by a UV-VIS spectrophotometer across this wavelength range. Colour measurement software is available for simple colour measurements too.

KEYWORDS: Hue, Chroma, Value(Lightness), Scotopic, Photopic, Mesopic, *Shades, Tints*, The C.I.E. or Commission Internationale de l'Eclairage (translated as the International Commission on Illumination), Perfect white diffuser (PWD), Abridged spectrophotometers, HBC system, Tristimulus, JIS standards.

INTRODUCTION :

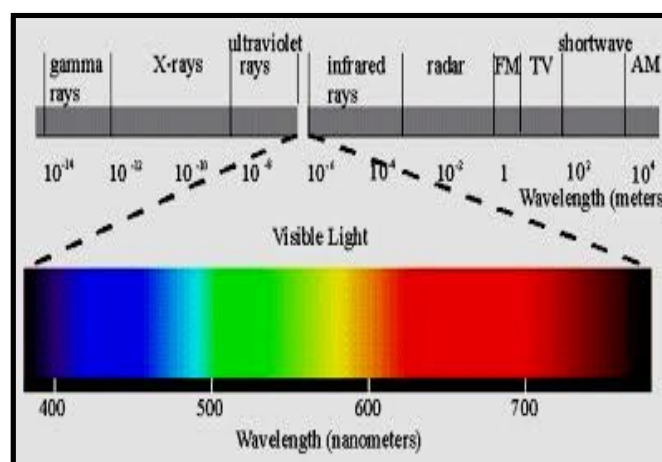
How would you describe the colour of this rose? Would you say it's yellow, sort of lemon yellow or may be a bright canary yellow? Your perception and interpretation of colour are highly subjective. Eye fatigue, age and other physiological factors can influence your colour perception. But even without such physical considerations, each observer interprets colour based on personal references. Each person also verbally defines an object's colour differently. As a result, objectively communicating a particular colour to someone without some type of standard is difficult. There also must be a way to compare one colour to the next with accuracy. The solution is a measuring instrument that explicitly identifies a colour. That is an instrument (spectrophotometer) that differentiates a colour from all others and assigns it a numeric value.

COLOUR VISION & PERCEPTION OF HUMAN EYE :

Colour vision is the ability of an organism or machine to distinguish objects based on the wavelengths (or frequencies) of the light they reflect, emit, or transmit.

Colours can be measured and quantified in various ways; indeed, a person's perception of colours is a subjective process whereby the brain responds to the stimuli that are produced when incoming light reacts with the several types of cone cells in the eye. In essence, different people see the same illuminated object or light source in different ways.

The characteristic colours are, from long to short wavelengths (and, correspondingly, from low to high frequency), red, orange, yellow, green, blue, indigo, and violet.



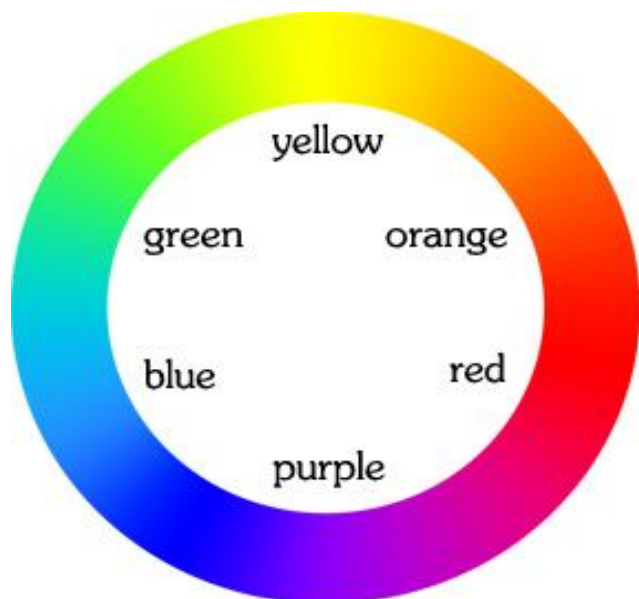
ATTRIBUTE OF COLOUR :

Each colour has its own distinct appearance, based on three elements: hue, chroma and value (lightness). By describing a colour using these three attributes, you can accurately identify a particular colour and distinguish it from any other.

HUE :

When asked to identify the colour of an object, you'll most likely speak first of its hue. Quite simply, hue is how we perceive an object's colour — red, orange, green, blue, etc. As the colour wheel illustrates, if you were to mix blue and green paints, you would get blue-green. Add yellow to yellow-green, and so on.

² Corresponding Author's E-mail ID : gmclt@hotmail.com / gmgcclt@gmail.com



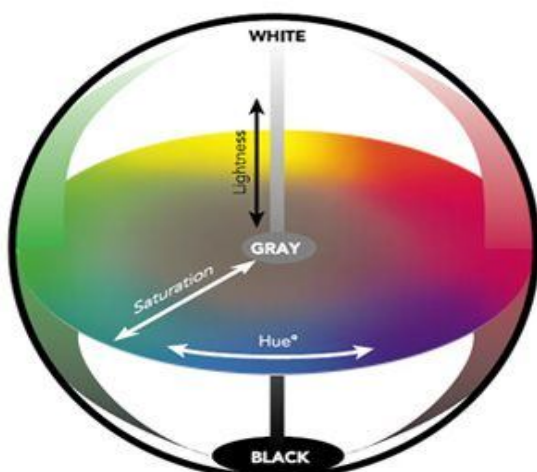
CHROMA :

Chroma describes the vividness or dullness of a colour — in other words, how close the colour is to either gray or the pure hue. For example, think of the appearance of a tomato and a radish. The red of the tomato is vivid, while the radish appears duller. Chroma also is known as saturation.

LIGHTNESS :

The luminous intensity of a colour — i.e., its degree of lightness — is called its value. Colours can be classified as light or dark when comparing their value.

For example, when a tomato and a radish are placed side by side, the red of the tomato appears to be much lighter. In contrast, the radish has a darker red value.



From the above figure shows that how chroma changes as we move from centre to the perimeter. Colours in the centre are gray (dull) and become more saturated (vivid) as they move toward the perimeter. It is confirmed that value, or lightness, characteristic is represented on the vertical axis.

Sufficient differences in wavelength cause a difference in the perceived hue; the just-noticeable difference in wavelength varies from about 1 nm in the blue-green and yellow wavelengths, to 10 nm and more in the longer red and shorter blue wavelengths. Although the human eye can distinguish up to a few hundred hues, when those pure spectral colours are mixed together or diluted with white light, the number of distinguishable chromaticities can be quite high.

HOW HUMAN EYE PERCEIVE COLOUR :

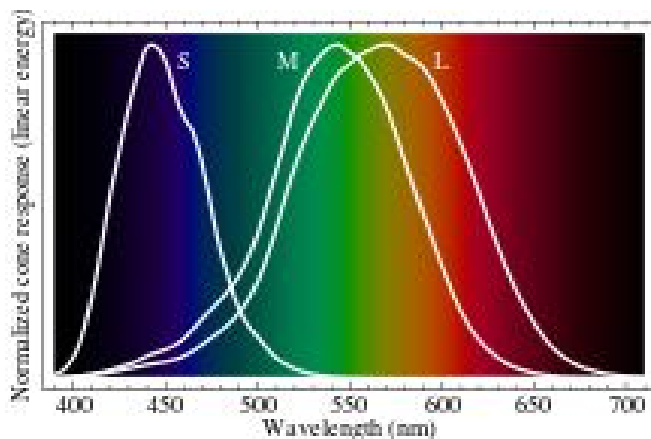
In very low light levels, vision is scotopic i.e. light is detected by rod cells of the retina. Rods are maximally sensitive to wavelengths near 500 nm, and play little, if any, role in colour vision. In brighter light, such as daylight, vision is photopic i.e. light is detected by cone cells which are responsible for colour vision. Cones are sensitive to a range of wavelengths, but are most sensitive to wavelengths near 555 nm. Between these regions, mesopic vision comes into play and both rods and cones provide signals to the retinal ganglion cells.

Perception of colour begins with specialized retinal cells containing pigments with different spectral sensitivities, known as cone cells. In humans, there are three types of cones sensitive to three different spectra, resulting in trichromatic colour vision. The cones are conventionally labeled according to the ordering of the wavelengths of the peaks of their spectral sensitivities: short (S), medium (M), and long (L) cone types. For example, while the L cones have been referred to simply as red receptors, microspectrophotometry has shown that their peak sensitivity is in the greenish-yellow region of the spectrum. The peak response of human cone cells varies, even among individuals with so-called normal colour vision.

Cone	Type name	Range	Peak wavelength
S	\hat{a}	400–500 nm	420–440 nm
M	\tilde{a}	450–630 nm	534–555 nm
L	\tilde{n}	500–700 nm	564–580 nm

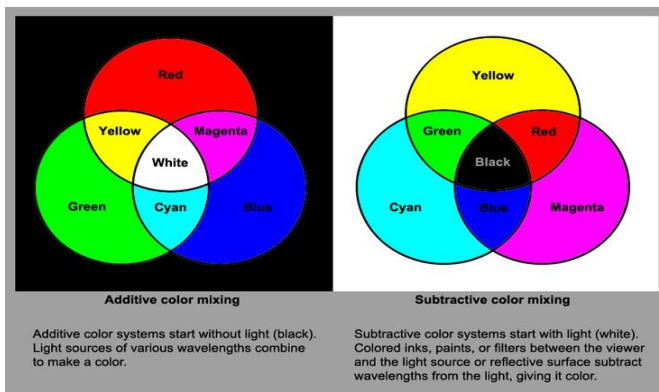


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A range of wavelengths of light stimulates each of these receptor types to varying degrees. Yellowish-green light, for example, stimulates both L and M cones equally strongly, but only stimulates S-cones weakly. Red light, on the other hand, stimulates L cones much more than M cones, and S cones hardly at all; blue-green light stimulates M cones more than L cones, and S cones a bit more strongly, and is also the peak stimulant for rod cells; and blue light stimulates S cones more strongly than red or green light, but L and M cones more weakly. The brain combines the information from each type of receptor to give rise to different perceptions of different wavelengths of light.

MIXING OF COLOUR :

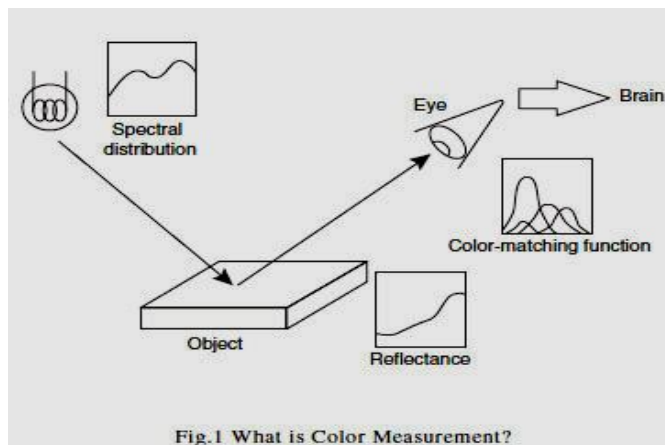


When mixing coloured light (additive colour models), the achromatic mixture of spectrally balanced red, green and blue (RGB) is always white, not gray or black. When we mix colourants, such as the pigments in paint mixtures, a colour is produced which is always darker and lower in chroma, or saturation, than the parent colours. This moves the mixed colour toward a neutral colour—a gray or near-black. Lights are made brighter or dimmer by adjusting their brightness, or energy level; in painting,

lightness is adjusted through mixture with white, black or a colour's complement. It is common among some painters to darken a paint colour by adding black paint—producing colours called *shades*—or lighten a colour by adding white—producing colours called *tints*. However it is not always the best way for representational painting, as an unfortunate result is for colours to also shift in hue. For instance, darkening a colour by adding black can cause colours such as yellows, reds and oranges, to shift toward the greenish or bluish part of the spectrum. Lightening a colour by adding white can cause a shift towards blue when mixed with reds and oranges. Another practice when darkening a colour is to use its opposite, or complementary, colour (e.g. purplish-red added to yellowish-green) in order to neutralize it without a shift in hue, and darken it if the additive colour is darker than the parent colour. When lightening a colour this hue shift can be corrected with the addition of a small amount of an adjacent colour to bring the hue of the mixture back in line with the parent colour (e.g. adding a small amount of orange to a mixture of red and white will correct the tendency of this mixture to shift slightly towards the blue end of the spectrum).

FACTORS GUIDING COLOUR MATCHING PHENOMENA :

Spectral distribution of the illumination and the spectral sensitivity characteristics (colour-matching function) of the eye are defined in the JIS standards, a colour value can be calculated if the spectral reflection of the object is known. To explain in more detail, in the JIS standard, the spectral distribution of the illumination and colour matching function are calculated using multiple conditions. We are familiar with a change in colour when the illumination is changed. Therefore, a different coefficient is set for each illumination spectral distribution. In addition, the colour also changes according to the view field (viewing angle), due to the relationship with the sensitivity distribution characteristics of the retina. Consequently, the JIS standard sets different colour matching functions according to the view field. Colour measurements require a wavelength range from 380 nm to 780 nm, which is equivalent to the wavelengths that can be sensed by the human eye. Colour measurements can be made by calculations based on spectral reflectance measurements by a UV-VIS spectrophotometer across this wavelength range. Colour measurement software is available for simple colour measurements.



SPECTROPHOTOMETER :

Spectrophotometry is the quantitative measurement of the reflection or transmission properties of a material as a function of wavelength. Spectrophotometry uses photometers that can measure a light beam's intensity as a function of its colour (wavelength) known as spectrophotometers.

WORKING PRINCIPLE OF SPECTROPHOTOMETER :

Spectrophotometers measure reflectance, transmittance, or absorbance for various wavelengths in the spectrum. In the case of reflectance measurement, the quantity measured is termed Reflectance Factor and is defined as the reflectance of the sample at a given wavelength compared to the reflectance of the perfect diffuse white measured under the exact same conditions. This is expressed in the following equation :

$$RF(\lambda) = R(\lambda)_{(sample)} / R(\lambda)_{(pwd)}$$

Commonly expressed as a percentage, %R, the reflectance factors are usually referred to as simply % Reflectance.

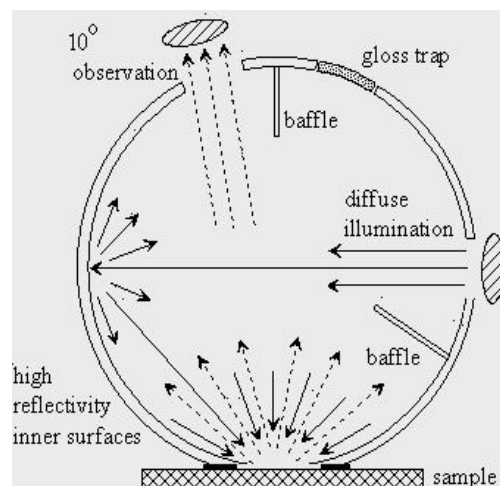
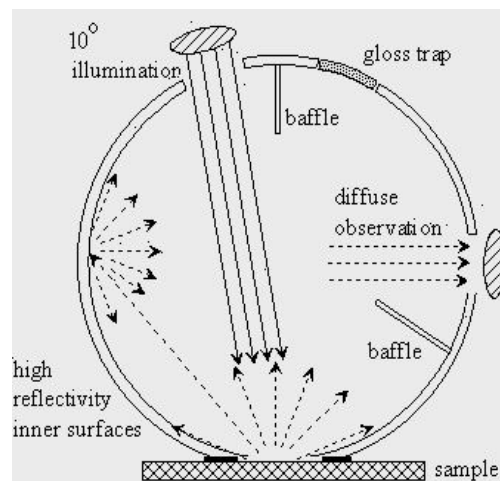
DESIGNS OF SPECTROPHOTOMETER :

All spectrophotometers must have certain key components - Light source, method of spectral separation or dispersion, and a detection system. As a fourth component, most all instruments have a microprocessor on board for data handling and computations. Many of the earlier reflectance spectrophotometers such as the Hardy were designed in a similar fashion to UV/VIS absorbance spectrophotometers used for chemical analysis of liquids in that they employed a scanning

mechanism. This provided wavelength by wavelength measurement and data collection at each 1nm or lower if desired. Although extremely accurate, these instruments were slow, mechanical, and expensive. Since reflectance curves are relatively smooth, it is generally agreed that for most applications it is not necessary to measure at 1 nm increments. For this reason, most modern reflectance instruments measure a band of a certain bandwidth which may be 5-20nm in width. Instruments of this type are referred to as abridged spectrophotometers.

INSTRUMENT GEOMETRY :

The C.I.E. or Commission Internationale de l'Eclairage (translated as the International Commission on Illumination), specified four geometric arrangements for instruments used to measure colour. These are (a) 0/45 (b) 45/0 (c) 0/Diffuse and (d) Diffuse/0.



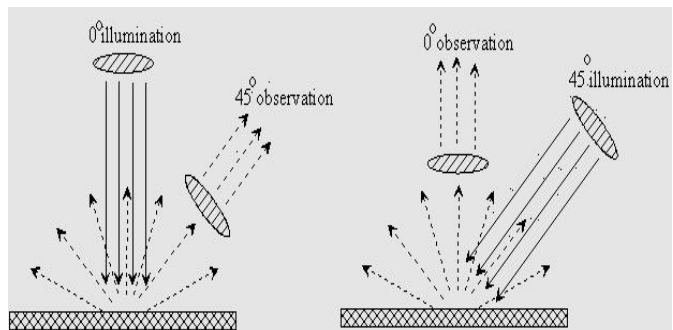


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The first angle given is the angle of illumination relative to a perpendicular drawn to the plane of the sample to be measured. This perpendicular is the normal angle, or 0 deg angle. The second angle is the viewing angle again expressed relative to the normal angle for the sample being measured. The term diffuse is used to indicate that the illumination or viewing is not directional but is rather diffuse, usually by the use of an integrating sphere.

45/0 or 0/45 Instruments :

Instruments with such directional geometry are most widely used in applications of quality control such as pass/fail determination, colour difference, shade sorting, or determination of colour change such as fastness and staining testing. It is often said that a 45/0 instrument measures not only colour difference but also some attributes of appearance such as surface gloss because of it's directional illumination(45/0) or viewing (0/45).



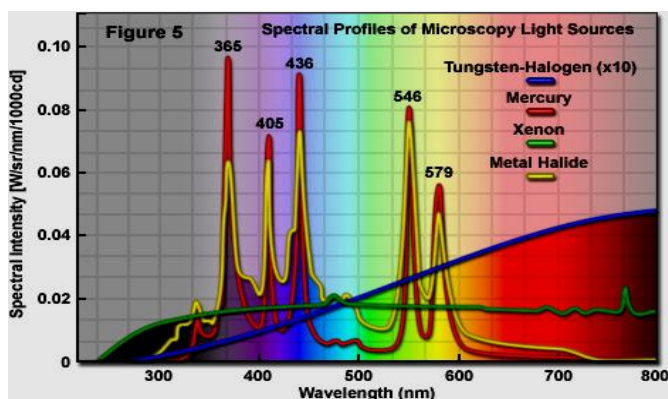
While the instrument does not directly measure these geometric attributes, it is no doubt more sensitive to surface texture as is illustrated in the following example: Take two samples A and B which are printed on the same small flat-bed machine. To avoid discussions of pigment printing density and penetration, we will print both samples with acid dyes using the same dye mix however, sample A is printed on a very low gloss (delustered) nylon, whereas sample B is printed on a highly glossy nylon. Now a 45/0 instrument will measure a fairly large colour difference (2-3 dE CIELAB) because the glossy substrate will give much higher reflectances but lower chroma or saturation. On a diffuse/0 instrument with the specular component included, the same samples will show little colour difference (< 0.40 dE CIELAB) because the diffuse illumination creates such multiple reflectances that the effects of the gloss are minimized. The question then becomes "What do you really want to measure?". For this reason, most instruments for colour formulation are diffuse/0 since the colourist wants to measure strictly

Article

colour, especially when standards are often not dyed or printed on the same substrate as requested for the match. Likewise, in many inspection areas, it is necessary to verify both the geometric quality and colour, and in these cases a 45/0 or 0/45 will provide the best assessment.

SOURCE OF LIGHT IN INSTRUMENTS :

For non-fluorescent materials, the reflectance factors are independent of the illumination (lamp) since they are ratios to the reflectance of the perfect white diffuser (PWD) under the exact same illumination. The only requirement is that the lamp possess sufficient radiant energy throughout the visible spectrum. There are in general two types of lamps used in instruments – tungsten filament and xenon discharge lamps. The early instruments used tungsten filament, usually filtered to simulate daylight. Modern filament lamps are quartz enveloped with a halogen to provide a very stable and intense illumination from 400-700nm. The lamps are very inexpensive but do not last more than six months under normal conditions. There are however, some disadvantages with the tungsten lamps which have contributed to the recent increase in xenon lamps. Continuous tungsten lamps create heat and must be cooled. Secondly, the heat and continuous light exposes the sample which may lead to variation in sample measurement due to such sensitivity.



XENON DISCHARGE LAMPS :

Xenon has many advantages and a few disadvantages. Among the advantages, xenon is a good daylight simulator. In the UV region, un-filtered xenon is much higher than daylight (D65) and usually requires the use of a UV filter to approximate daylight. If left un-filtered, xenon may over-excite a fluorescent material, therefore most all instruments today use a low wattage xenon lamp, or provide a means of filtering the UV portion (360-400nm).



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Xenon is an inert gas which when highly charged will convert the electron build-up to photons, emitting a flash for a fraction of a second. A sample being measured is therefore not exposed to continuous light, nor is there any heat to dissipate. Although the lamp is intense, it is not as spectrally consistent or stable as a continuous lamp such as tungsten. For this reason, all instruments which use xenon must be dual-beam designs. A reference beam, usually aimed at a point inside the integrating sphere, provides a reference measurement against which the sample measurement is adjusted to account for any change in the illumination.

LIGHT DISPERSION – FILTERS & GRATINGS :

Today's instruments, there are primarily two types of dispersing elements used - gratings and filters, with gratings being the most commonly used. It must first be pointed out that the quality or performance of most dispersing elements such as filters and gratings is determined by its ability to separate light into bands of colours. These bands or spectral distribution are measured in nanometers across the width of the individual band (depending upon the detection type) at the point of detection. The width is determined at 50% of maximum peak height for the band measured.

INTERFERENCE FILTER :

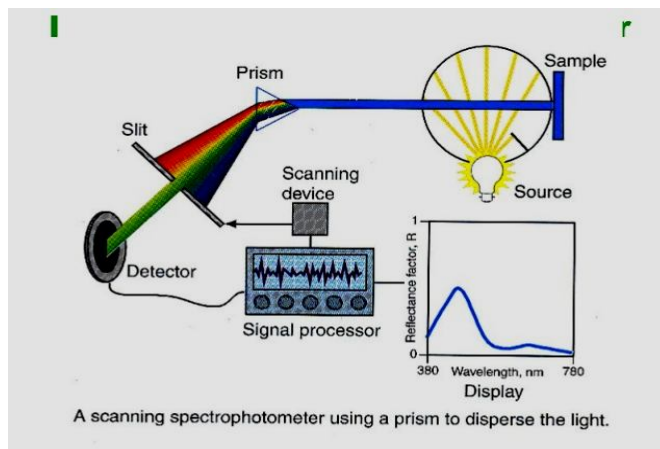
The interference filter is mounted as a filter wheel which is usually rotated by a small electric motor directly in line with the sample and/or reference beam. This simple design uses a single photodiode detector which measures the dispersed light as the filter rotates resulting in bands of variable width. Most are designed to provide an average rather than a fixed bandwidth of about 10nm. Many instruments still in use today are based upon this interference filter such as the Hunter D53, D54, and the ACS Spectro-Sensor, and the ACS Chroma-Sensor 5. Interference filters may also be positioned statically in sequence to provide the necessary spectral distribution.

The resulting bands are measured with diode array detectors situated accordingly and are usually 12-15 nm in bandwidth. Instruments of this type are the X-rite portable spectrophotometers such as 968, and SP series.

DIFFRACTION GRATINGS :

A grating is essentially a glass plane with a large number of grooves etched or ruled into the surface. When light strikes this grating, a pattern of diffraction and interference will cause light of different wavelengths to be

produced at various angles. A ruled grating with about 300 lines per millimeter will produce a distribution of visible light suitable for measurement. These gratings produced a distribution which was detected by placing photo-diodes along the distribution at certain bandwidths, usually 10nm or 20nm. The plane grating has been superseded now by a technique of laser etching to produce a pattern of grooves in a concave glass surface. This concave holographic grating has the advantage of providing both the dispersing and the collecting mechanisms into a single component. The dispersed light can then be imaged or projected onto an array of photo-diodes. The concave grating requires less optical space and when combined with fiber optics, the instrument can be made extremely small and lightweight. This optical design is used in the Datacolour Spectraflash, Dataflash, and Microflash instruments.



DETECTORS :

Most modern instruments use fixed gratings and an array of photo-diode detectors to achieve the same purpose, but at a much lower cost of production and lower cost of maintenance in the long term. The manufacturing of micro-processors and integrated circuits has resulted in the development of high quality photo-diodes built on a single solid state electronic micro-chip. These silicon based diodes are ideal when placed in an array across the spectral distribution from a fixed diffraction grating or filter assembly. Because the optical components are fixed, these instruments are extremely stable exhibiting very little short-term or long-term drift in accuracy or precision.

Another advantage is that these gratings and integrated detectors are highly reproducible. This has resulted in instruments which have excellent absolute agreement.



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COLOUR MATCHING SYSTEM WITH ADDITIONAL SPECTROPHOTOMETER & SOFTWARE :

Colour matching system with system B3 Scan is a simple process with the new developed spectrophotometer. Simply place the spectrophotometer directly on the dashboard, leather or vinyl surface and scan. A few minutes after the scan the software gives you the complete mixing recipe.



HOW DOES THE SMART REPAIR COLOUR MATCHING KIT WORK ?

The original leather and vinyl is "scanned" with the hand-held spectrophotometer. The resulting data is converted into an easy to follow recipe drawing on 5 of the 13 "base" B3 scan colours. The list of standard colours made by HBC system. The recipe gives the exact amount of each colour that is needed to achieve the volume required, from as little as 50ml to 5 litres per mix. All that is needed is to measure and mix the colours thoroughly, add the right level of dulling agent (gloss adjuster) to adjust the sheen to the correct level. Now you are ready to paint the repair area.

Colour matching system's key advantages :

- 1) Exact match of every pigmented and aniline leather and vinyl.
- 2) Eliminate waste of colours necessary with manual colour matching to reach the correct one.
- 3) Dramatically time reducing. Gives perfect results in seconds not hours.
- 4) Improve sales margin on restoration & colour matching works.
- 5) Doesn't need computer experience, user friendly software interface.
- 6) Very light and portable hardware solution, ideal for mobile workers.
- 7) Improve work time management, you are sure to complete the colour matching in minutes.

- 8) Clean, fast and easy colour matching process.
- 9) Greatly reduce necessary skill request to realize perfect colour matching.
- 10) Full capable PC running standard Windows software.

ANALYSIS :

COLOUR MEASUREMENT :

To perform colour measurements with a UV-VIS spectrophotometer, first measure the spectral reflectance of the object. Calculations based on the spectral distribution of the illumination, the spectral reflectance obtained for the object, and the colour-matching function express the colour as a numeric value. Illumination spectral distributions and colour matching function values are stored in the colour measurement software to obtain colour measurement values when the spectral reflectance spectrum is measured. The XYZ tristimulus values are the basis of colour measurement. JIS Z 8722 "Methods of colour measurement — Reflecting and transmitting objects" calculates the XYZ tristimulus values using the expressions below.

$$\left. \begin{aligned} X &= K \sum_{380}^{780} S(\lambda) \bar{x}(\lambda) R(\lambda) \Delta(\lambda) \\ Y &= K \sum_{380}^{780} S(\lambda) \bar{y}(\lambda) R(\lambda) \Delta(\lambda) \\ Z &= K \sum_{380}^{780} S(\lambda) \bar{z}(\lambda) R(\lambda) \Delta(\lambda) \end{aligned} \right\} \quad (1)$$

$$K = \frac{100}{\sum_{380}^{780} S(\lambda) \bar{y}(\lambda) R(\lambda) \Delta(\lambda)}$$

Where,

$S(\lambda)$: illumination spectral distribution value at wavelength λ
 $x(\lambda), y(\lambda), z(\lambda)$: colour-matching function values in the XYZ colour system
 $R(\lambda)$: sample spectral reflectance
 $\Delta\lambda$: wavelength interval for calculation

In addition to the XYZ tristimulus values, several other colour specification systems for expressing colours are known. The colour measurement software can perform calculations in the following colour specification system: XYZ tristimulus values, xy colour coordinates, Hunter lab colour scale, $L^*a^*b^*$ colour system, $L^*u^*v^*$ colour system, and $U^*V^*W^*$ colour system. Values for colour specification systems other than the XYZ tristimulus value system are calculated from the XYZ tristimulus values.



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COLOUR DIFFERENCE :

A colour specification system is a method of expressing colours as numerical values, while colour difference expresses the difference between colours. Calculations to numerically express colour difference values use the Uniform Colour Space (UCS) colour specification system that is closer to the human visual sense. The $L^*a^*b^*$ colour system is a typical UCS colour specification system. L^* represents the brightness, and a^* and b^* represent the hue and saturation. JIS Z 8729 "Colour specification — CIELAB and CIELUV colour spaces" shows the method of calculation in the $L^*a^*b^*$ colour system. The colour difference is calculated using the $L^*a^*b^*$ value for each object (sample) colour. The colour difference ΔE^*_{ab} in the $L^*a^*b^*$ colour system is determined using expression (2) in JIS Z 8730 "Colour specification — Colour differences of object colours."

$$\Delta E^*_{ab} = \sqrt{(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2}$$

If the colour coordinates of two objects (samples) are denoted $L^*_1 a^*_1 b^*_1$ and $L^*_2 a^*_2 b^*_2$, it can be seen from the expression

$$\Delta L^* = L^*_1 - L^*_2 ; \Delta a^* = a^*_1 - a^*_2 ; \Delta b^* = b^*_1 - b^*_2$$

that the colour difference is equivalent to the distance between two points in the $L^*a^*b^*$ colour space. The greater the difference between the two colours, the larger the colour difference value. In addition to displaying the colour system and the colour difference in the colour specification system, the colour measurement software can perform other calculations including whiteness index, yellowness, major wavelengths, and excitation purity.

SETTING COLOUR MEASUREMENT CONDITIONS :

Several conditions are set for the colour measurement calculations. These conditions are the illumination (light source) and view field (viewing angle). Settings for the illumination are required, as the colour varies according to the illumination on the sample. Illumination settings include A, B, C, and D65. In the JIS standards, these are called standard illuminant and supplementary standard illuminant. The spectral distribution is different for each illuminant. For example, standard illuminant A is used to calculate object colours under illumination by an incandescent light bulb. Standard illuminant D65 is used to calculate object colours in daylight including the UV

light region. The colour measurement software allows user-defined illumination settings to handle illumination conditions not provided as standard. The view field (viewing angle) must also be set, as the colour appears different when a sample is observed close-up or from a distance. For a view field up to 4 degrees, a 2° mean viewing angle is used for the calculations (colour viewed from a distance); for a view field over 4 degrees, a 10° mean viewing angle is used for the calculations (colour viewed close-up). The colour-matching functions differ for a 2° mean viewing angle and a 10° mean viewing angle. If the parameter settings are changed while reading the spectrum, the displayed colour measurement values in the list change immediately. This figure shows settings of calculation parameter.

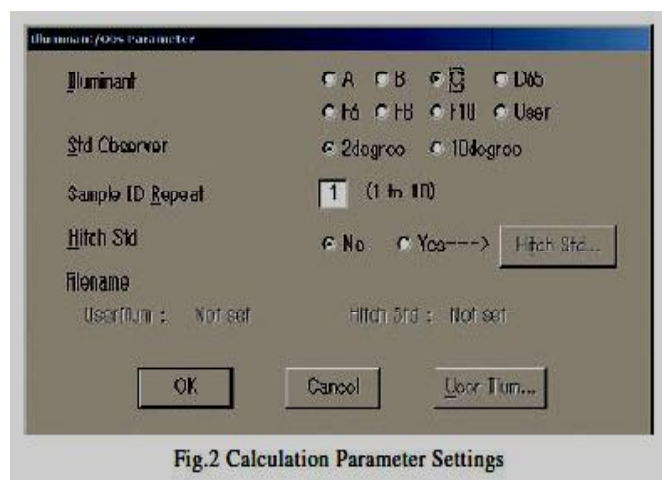


Fig.2 Calculation Parameter Settings

The colour measurement software can simultaneously display up to six calculation items. If the calculation items are changed while reading the spectrum, the displayed colour measurement values change immediately.

Fig. 3 shows the screen to select the calculation items.

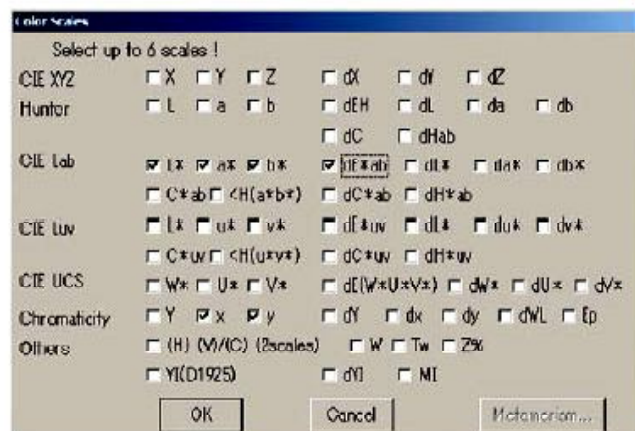


Fig.3 Selecting the Calculation Items



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SPECTRAL REFLECTANCE MEASUREMENTS :

The measurement parameters must be set before measuring the spectral reflectance. To set the measurement parameters, set the photometric value (transmittance / reflectance), wavelength range (normally set from 380 nm to 780 nm), scan rate, slit width, and sampling pitch. From following figure shows the measurement parameter setting screen.

Fig. 4 shows the measurement parameter setting screen.

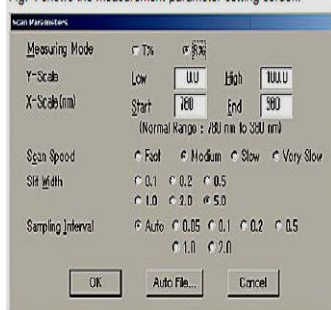


Fig.4 Measurement Parameter Settings

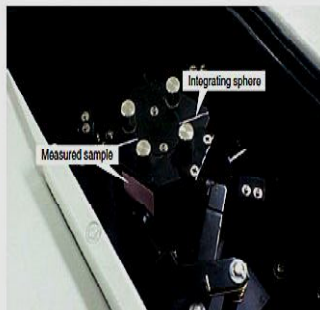


Fig.5 Sample Positioned on Integrating Sphere

An integrating sphere is often used to measure the spectral reflectance of an object. The spectral reflectance can be measured by installing the sample as shown in the photograph. Following figure show examples of spectral reflectance measurements using an integrating sphere. Fig. 6 shows the spectral reflectance measurement results for pink paper, and Fig. 7 shows the spectral reflectance measurement results for light blue paper.

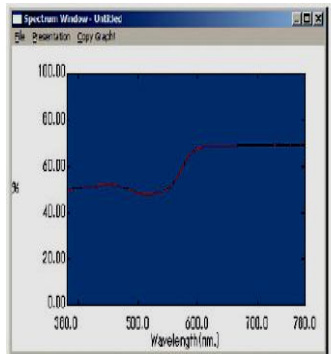


Fig. 6 Measured Reflectance Spectrum for Pink Paper

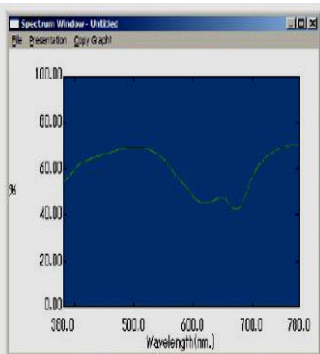


Fig. 7 Measured Reflectance Spectrum for Light-Blue Paper

Barium sulfate was used as the standard white plate for reference. The visible range encompasses the blue colour system (400 nm to 500 nm), green colour system (500 nm to 600 nm), and red colour system (600 nm to 700 nm). The graphs show that the pink paper reflects more in the red colour system, while the light-blue paper

reflects more in the blue colour system. The colour measurement values calculated from the spectral reflectance are displayed as a list.

The calculation conditions were illumination C and 2-degree viewfield. Colour measurement results for the pink paper ($L^* = 79.45$, $a^* = 11.50$, $b^* = 4.48$ [red frame in diagram]) & also for the light-blue paper ($L^* = 81.71$, $a^* = -11.56$, $b^* = -5.95$ [blue frame in diagram]). The colour measurement software can also display the colour difference. The colour difference is calculated based on a reference sample (the sample with ID set to 0 [green frame in diagram]). In this case, the pink paper is set as the reference sample. The colour difference between the pink paper and the lightblue paper is $\Delta E^*_{ab} = 25.41$ [black frame in diagram].

DATA CORRECTION :

A standard white plate is used for the spectral reflectance measurements required to measure the object reflection colour (colour measurement by reflection). The standard white plates used include barium sulfate, magnesium oxide, alumina, and fluoro-resin. However, as these have high reflectance across the overall measurement wavelength range, adequate colour comparison is possible if the same instrument is used. However, as a standard reflectance plate does not form a perfect diffusing surface and does not offer 100% reflectance, the spectral reflectance values measured for samples are relative values. Extremely high-accuracy measurements are required to make a comparison of the measured results obtained by different instruments. Making highly accurate measurements requires correction of the spectral reflectance to the spectral ratio reflectance with respect to a perfect reflection diffusing surface. The white plate correction function is used for this correction. By entering the spectral reflectance for the corrected standard white plate, the measured spectral reflectance is corrected to be equivalent to the measured results for a perfect reflection diffusing surface. Instead of entering the surface reflectance, the value calculated from the refractive index n using following expression can be entered:

$$r(\%) = 100 \times \left(\frac{n-1}{n+1} \right)^2$$

This yields 4% surface reflectance for glass with refractive index 1.5.



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CONCLUSION :

JIS standards define calculation methods and coefficients for colour measurements in detail. If the spectral reflectance is known, the calculations can be performed using spreadsheet software. However, different coefficients are required for different illumination and viewfields, which requires a huge number of inputs. The colour measurement software can be used to select the conditions and measure the spectral reflectance to simplify colour measurements.

Colour matching in leather is a great work, because the price and acceptance of leather is depend upon its outlook appearance. If the colour of finished leather is dull then no one can be interested towards it, forget about its price. We performed different unit operation &

also introduce various chemical to produce good quality leather. Therefore, why should we neglect its final appearance? We have to take much serious about this colour matching process. The use of spectrophotometer is the best way to do this work accurately.

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I imagine a future full of high-quality leather with a lower impact on the environment



Imagine a world in which you do not have to choose between quality and sustainability. A world where you produce premium leather with a simplified tanning process that not only saves time and energy, but also lowers the environmental impact. This is the world of Stahl EasyBlue Tan™.

At Stahl, we strongly believe that what can be imagined, can be created. Stahl EasyBlue Tan™ is a direct result of this premise. Every day, we challenge ourselves to achieve our ambitions. Stahl EasyBlue Tan™ produces leather with a high tear strength, full flanks and a tight and flat grain, yet the

environmental benefits are obvious: 80% less salt in waste water, 45% less chrome, 60% less acid, 20% less nitrogen and up to 40% less water needed. With Stahl EasyBlue Tan™, tanneries produce all types of high-quality leather beyond the standard wet-blue leather product specifications.

If you would like to know what Stahl EasyBlue Tan™ can do for your business, please visit www.stahl.com or contact us at: stahl.india@stahl.com

If it can be imagined, it can be created.

I imagine a future full of excellent leather creations that are more sustainable



We love quality leather. The distinctive look, soft touch and luxurious feel. We love to be more sustainable too. This is exactly what our alternative, sustainable tanning system Stahl EasyWhite Tan™ can do for you.

High quality and durable

Leather production processes have always been a battle between quality, sustainability and costs. Those days are over. Stahl EasyWhite Tan™ creates high-quality leather that is thinner and lighter than ever before. Our system enables tanners to produce all types of metal-free leather to the standard leather product specifications and beyond. From light to dark colored leather. Stahl EasyWhite Tan™

simplifies the tanning process, resulting in time and energy and constant productivity. The number of chemicals is reduced by one-third, 40% less water is used and no additional salt is needed reducing salt in waste water by 80%.

Altogether, our Stahl EasyWhite Tan™ meets the growing demand for more sustainable leather without compromising on quality and usability. Curious what it can do for your business? Please visit www.stahl.com or contact us at stahl.india@stahl.com

If it can be imagined, it can be created.

We imagine high-quality leather with long lasting elegance



People are purchasing more leather items than ever before. Due to the large global demand for premium leather, it is becoming increasingly difficult to source high quality raw material. That is where our Mirage® Upgrading Range comes in.

Natural feel and long lasting elegance

We offer upgrading solutions to improve the leather quality through the use of specific techniques. Our solutions mask grain defects from leather and increase the usable surface area, resulting in a higher cutting yield. The result? Fashionable leather without compromising on the natural feel and long lasting elegance - maintaining its high quality and distinctive

look and feel. Therefore, with Mirage® Upgrading Range we secure the future of the leather business as high consumer satisfaction is guaranteed.

Altogether, with our Mirage® Upgrading Range you make ultimate use of raw hides which is beneficial to both tanners and manufacturers of leather items. Curious what it can do for your business? Please visit www.stahl.com or contact us at stahl.india@stahl.com

If it can be imagined, it can be created.



I imagine a future full of leather finished in a qualitative, compliant and sustainable way

At Stahl, we truly believe that what can be imagined, can be created. Every day, this premise challenges us to fulfil this ambition. As creating a better future is our prime objective, we are proud to present Stahl Neo. This product line is unique in the industry, as the products not only comply with the Zero Discharge Hazardous Chemicals (ZDHC) Manufacturing Restricted Substances List (MRSL), but go beyond these guidelines.

Working with Stahl Neo means your business will be absolutely future-proof. Switching to these new leather finish products is

easy and cost effective. Of course, Stahl is more than willing to help you make the transition that will open up a world of endless possibilities.

If you would like to know what this portfolio of sustainable finishes can do for your business, please visit www.stahl.com or contact us at: stahl.india@stahl.com

If it can be imagined, it can be created.



We imagine 100% sustainable beamhouse systems with stunning leather quality

At Stahl, we truly believe that what can be imagined, can be created. This premise was the outset for a 'What-If' question. As nearly 70% of the wastewater of leather production comes from beamhouse systems, we imagined the environmental benefits if we could replace traditional leather chemicals with 100% natural products without sacrificing leather quality.

Right now, we are doing just that with Proviera® - Probiotics for Leather™. The most obvious advantage of this basic tannery process is that it improves leather quality while being non-hazardous and non-toxic. But there is more.

Proviera® - Probiotics for Leather™ opens up endless possibilities. Not only is it much more sustainable, it is also safer for both tanners and consumers. A company working with Proviera® - Probiotics for Leather™ is a future-proof company.

If you would like to know what the Proviera® - Probiotics for Leather™ products can do for your business, please visit www.stahl.com or contact us at: stahl.india@stahl.com

If it can be imagined, it can be created.

We take a frontrunner position when it comes to sustainability



At Stahl, we truly believe that if it can be imagined, can be created. That's why, for over 80 years, we have challenged ourselves to create the best possible solutions for our partners. Solutions that made Stahl grow into the global partner in innovative chemical solutions for leather products and performance coatings, providing quality products, expert knowledge and the best possible service.

As our prime objective is to create a better future for generations to come, we established a leather product portfolio that not only comply with the Zero Discharge Hazardous Chemicals (ZDHC) Manufacturing Restricted Substances List (MRSL), but go beyond these guidelines.

A selection of our future-proof innovations are; our alternative tanning system Stahl EasyWhite Tan™ that reduces the use of water, salt and energy, Proviera® - Probiotics for Leather™ as being our 100% biodegradable beamhouse system and the Stahl Neo leather finishes portfolio. This portfolio contains our sustainable leather finishes that comply with our future-proof vision for the industry.

Curious what we can do for you and your company when it comes to sustainability? Please don't hesitate to contact us at: stahl.india@stahl.com, or visit our website.

We believe that together we are able to create a better future.



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NEW INSTRUMENTS FOR LEATHER TESTING AT RCED (CSIR-CLRI), KOLKATA 700 046

SATRA Circular Rub Fastness Tester, SATRA Digital Thickness Gauge and one Spectrometer from Premier Colourscan Instruments Private Ltd. Mumbai have been added to the RCED (CSIR-CLRI), Kolkata laboratory. With the acquisition of these instruments, it will be possible for this centre to distinguish leathers having light shades from those dyed in medium or dark shades. This newly acquired facility will make this centre independent in terms of capability for testing all thirteen types of leather including 1. Burnishable, 2. Pull up, and 3. Wax / Oil Coated categories for Finish Leather Certification for export. The facility will also prove invaluable for objective assessment of batch to batch shade variation in supplied dyestuff, pigment dispersion and finished leather, which is one of the commonest causes of dispute in leather industry in the country. And all these testing will be in addition to the standard testing this centre has been doing for the industry so long.



RCED (CSIR-CLRI), Kolkata will be very happy to utilize the incredible power of its newly acquired facility in resolving all disputes resulting from shade variation for the overall benefit of the industry. The laboratory may be contacted at (033)2329 2381 / 6046 or rcedcal@bsnl.in.

ILLEGAL ABATTOIR BAN IN UP HITS PUNJAB'S LEATHER INDUSTRY

Following stringent action and the subsequent closure of illegal abattoirs in Uttar Pradesh (UP) soon after the Bharatiya Janata Party (BJP) came to power last month, the roughly Rs. 20,000 crore leather industry has been adversely impacted by short supply.

Acting on the National Green Tribunal's (NGT's) directive to close illegal slaughterhouses in UP, thousands of unregulated and unregistered units, mainly manually operated, in thickly populated areas have been shut down.

Organized slaughterhouses, which export meat, are operating, they number roughly 45, and are not in a position to cater for the big demand for rawhide. This has virtually squeezed the supply of rawhide to industries based in Kanpur and Unnao districts.

"The leather industry has taken a hit of almost 50 per cent due to short supply of raw hide to leather manufacturing and exporting units. There is a severe demand-supply crunch," Up Leather Industries Association (UPLIA's) former President Taj Alam told Business Standard.

Further, he said the prices of rawhide had appreciated by 20 per cent owing to supply scarcity over the last several weeks. "If this situation, the state leather industry would not be able to meet even half its current fiscal target.



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We are clearly not in a position to bargain with our buyers to renegotiate export prices since our buyers can source finished leather goods from other Asian countries like Pakistan, Bangladesh and Sri Lanka, where exporters are not faced with such a crunch situation," he added.

Meanwhile, Council for Leather Exports (CLE) regional chairman Javed Iqbal put the likely impact on the local leather industry at a much steeper 80 per cent.

LEATHER EXPORTERS IMPORTING HIDES

Big leather exporters of the country are importing cow hides to meet the shortfall in domestic supplies caused by problems in transportation of the material from one location to another.

After the ban on cow slaughter was effected in some states, the leather industry had been adversely affected due to shortage in supplies of hides needed for exports. "Getting adequate domestic supplies of good quality hide is a problem. Now big exporters are importing cow hides from Africa, Brazil, Mexico, New Zealand and Australia," regional chairman of the Council for Leather Exports (CLE) of East, Ramesh Juneja said.

He said buffalo hides are available in UP and Punjab, as there is no ban on slaughter of the animal, but transportation of hides are a major hurdle as some outfits are creating problems during transit.

"Even old cows or hides of those animals which died of natural causes are also not allowed to be transported from one location to another," Juneja told PTI. Cow slaughter is officially allowed in West Bengal and Kerala, but of only those animals which have become old, are unable to give milk and are certified by a veterinary doctor, he said.

(Source : The Statesman – 22.04.2017)

He said importing of cow hides has now become a viable option as the rupee has become stronger against the dollar.

He said leather exports are suffering badly and the target of meeting the USD27-billion in the next five years will not be possible.

The annual foreign exchange earnings from leather exports are USD 13 billion, he said. During the first quarter

of the current fiscal, there will be a 20 per cent drop in exports, Juneja said adding, reduction in availability of hides is around 25 per cent.

(Source : P. T. I.)

RUPEE RISE WORRY FOR EXPORTERS

The rupee has gained 5 per cent against the dollar this year, forcing exporters to hedge the currency and turn to policymakers to come to their rescue as shipments have started recovering.

The rupee ended the week at 64.41 to the dollar amid a strong foreign fund inflow and signs of economic recovery.

So far this year, the Indian currency has gained 5 per cent, while foreign institutional investors have bought \$6.7 billion worth of shares and \$6.26 billion debts.

The rupee could further strengthen with the goods and services tax getting the ascent of the President and the government sending signs of pushing economic reforms. In the past few days, the government has taken measures such as depoliticizing rail freight and passenger fares, listing state-owned units, introducing dynamic pricing of petrol and diesel and rolling out a roadmap for fiscal deficit.

"The currency appreciation has compounded the problems of exporters. While the rupee is strengthening, the currencies of many competitors are weakening against the dollar.

Going by the trend of flight of capitals from emerging economics to the US and huge capital inflows into India, the only bright spot, I am worried that the trend may continue putting huge burden on exporters to maintain price competitiveness," Ajay Sahai, director-general of FIEO, said.

A poll of 15 forex traders and strategists suggests the rupee could rise to 63 levels in the next one month. Some brokerages have even predicted the rupee to touch 60 against the dollar in the coming months on the back of strong foreign fund inflows and an improved economic climate.

"What is more disconcerting is the fact that the rupee is gaining ground and eroding the exporter's competitive edge when exports have picked up in the last few months.



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News Corner

Going forward, with this kind of strength of the domestic currency, it will be tough," T. S. Bhasin, chairman of the Engineering Promotion Council of India, said.

TRUMP CARD; DELHI TO GET TOUGH IF US BLOCKS INDIAN EXPORTS

India has decided to pro-actively find ways to counter possible moves by the Donald Trump administration to block Indian exports as part of the US Trade Department's review process of the 16 nations with which the US has a trade deficit.

The Prime Minister's Office has asked all Ministries and Departments to take note of items from their respective sectors that are imported from the US and which could be restricted through various means if required, a government official said.

"Since seeking a resolution at the World Trade Organization is time-consuming, we need a back-up plan in case the US takes unwarranted steps to check imports from India. We have to be prepared to counter the move with similar measures," the official said.

However, it might not be an easy exercise for India to identify imports from the US where there is a possibility of imposing restrictions.

"We import a lot of high-tech goods from the US. We absolutely need those items and there is little scope to impose restrictions here," the official added. "Similarly, we import a variety of fruits and vegetables where we have already imposed high import duties. Finding additional ways to curb these will also be difficult," the official noted. Import restrictions can be imposed through non-tariff measures, for instance, by rejecting consignments on grounds of low quality and standards.

"The fact remains that the Indian industry is more vulnerable than the American industry as we export much more to the US than we import. For instance, our sectors such as textiles and leather, which are labour-intensive, can take a big hit if the US decides to make its import policies unfavourable," the official said.

Early last month, Trump signed an executive order launching a 90-day investigation of countries, including India, against which the US runs a bilateral trade deficit.

Assistant US Trade Representative Mark Linscott, in his discussions with officials from the Commerce Ministry in New Delhi, reiterated that his government would seriously look at the \$24 billion trade deficit it has with India and find ways to address the situation.

(Source : Businessline – 05.05.2017)

CLRI PROJECT CONVERTS SALT FROM RAW HIDES

Scientists at India's Central Leather Research Institute (CLRI) have discovered a way to break down the salt left over from tanning processes into saleable elements, according to local press.

The salt has been building up at common effluent treatment plants and is difficult to dispose of.

Although still at a trial stage, the CLRI said the process to separate the waste into sodium chloride and sodium sulphate has reached the required purity and a pilot project is being launched at a salt farm in Bhavnagar.

(Source : Leatherbiz.com – 05/05/2017)

LEATHER UNITS IN KOLKATA COULD CREATE 6,000 JOBS

Major players from the leather industry in Kanpur and Chennai have agreed to invest Rs 1,000 crore (\$155 million) to set up tannery units at the Kolkata Leather Complex, according to Amit Mitra, West Bengal's minister of industry and finance.

Mr Mitra made the comments following a meeting with 20 tannery owners from Kanpur and Chennai, in which they expressed how impressed they were with the facilities at the complex, according to reports in the Indian media. There will be 25 acres of land set aside for these units.

They are expected to create 6,000 direct jobs and a further 4,000 indirect jobs as a result of the development of the complex. As well as the units, the state government is also targeting the establishment of a new waste management system, a leather design institute and a leather training institute.

(Source : Leatherbiz.com – 22/05/2017)



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Economic Corner

LOOKING TO SAVE TAX FOR F.Y. 2017 – 18 ? HERE ARE 6 INVESTMENTS WITH TAX FREE INCOMES

While investing in a tax-saving instrument or for that matter any investment, it's important to keep an eye on the taxability of its income. If the income earned is taxable, the scope to build wealth over long term gets constrained as taxes will eat into the returns.

In the tax saving instruments such as National Savings Certificate (NSC), Senior Citizen Savings Scheme (SCSS), 5-year time deposits in bank and post office, the interest amount gets added to one's income and hence is liable to be entirely taxable. so, even though they help you save tax for the current year, the interest income becomes a tax liability in each year till the tenure ends. Anil Rego, CEO & Founder of Right Horizons, says, "One must note that (taxable tax savers) instruments will help in saving the tax to an eligible limit both on investments and on maturity. Since they provide the tax benefits, the returns on them are likely to be below the market returns."

The post-tax return in them, therefore, comes down after factoring in the tax. For example, for someone who pays 30.9 percent tax, the post-tax return on a 5-year bank FD of 7 per cent is 4.8 per cent per annum!

They can still be tax-exempt income if even after adding the interest income, the individual's total income remains within the exemption limit as provided by income tax rules. Illustratively, a taxpayer between ages 60-80 earns only interest income from such taxable investments of about Rs 3 lakh a year. Since the income for such individuals is exempted till Rs 3 lakh, even the interest earned from investment in taxable products does not translate into tax liability for them.

But, for most others especially those earning a salary or having income from business or profession, choosing tax savers that come with E-E-E status helps. The investment in these get EEE benefit i.e. exempt- exempt- exempt status on the income earned. The principal invested qualifies for deduction under Section 80C of the Income Tax Act, 1961 and the income in all of them is tax exempt under Section 10.

Here are few such tax savers that not only help you save tax but also help you earn tax-free income. But, not all are the same in terms of features and asset-class, so making the right choice is essential.

1. EQUITY-LINKED SAVINGS SCHEMES

Equity-linked savings schemes (ELSS) are diversified equity mutual funds with two differentiating features - one, investment amount in them qualifies for tax benefit under Section 80C of the Income Tax Act, 1961, up to a limit of Rs 1.5 lakh a year and secondly, the amount invested has a lock-in period of 3 years. Every mutual fund (MF) house offers them and generally uses the word tax-saving in its name to distinguish them from their other mutual fund schemes. The returns in ELSS are not fixed and neither assured but is dependent on the performance of equity markets.

One may opt for dividend or growth option in them. While the former suits someone looking for a regular income, although not assured, the latter suits someone looking to save for a long-term need.

However, dividend in an equity MF scheme (including ELSS) should not be construed as similar to the dividend received from an equity share. In the latter, the dividend is declared out of profits generated by a company while in a MF, it is out of the NAV. For a MF unit holder, receiving the dividend is merely equal to the redemption of units.

What makes ELSS income tax-free:

As ELSS is an equity oriented scheme with more than 65 percent of allocation into equities, (in practice, it is 80 percent or more) the long-term capital gains in them is nil. Further, the dividends in an equity scheme are tax-free. Hence, investing in ELSS yields tax-free income both for the dividend and the growth unit holders.

To mitigate risks, one may diversify across more than one ELSS scheme (based on market capitalization and industry exposure) after considering their long-term consistent performance. After the lock-in ends, one may continue with the ELSS investments similar to any open-ended MF scheme. However, review its performance against its benchmark before doing so. Investing in ELSS not only helps you save for a long term goal but also helps you save tax and generate tax-exempt income.

2. PUBLIC PROVIDENT FUND

For decades, Public Provident Fund (PPF) Scheme, 1968 has been a favourite savings avenue for several investors and is still standing tall. After all, the principal and the interest earned have a sovereign guarantee and the returns are tax-free.



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PPF currently (subject to change every three months) offers 7.9 percent per annum. For someone paying 30.9 percent tax (highest income slab), it translates to nearly 11.43 percent taxable return. Now, how many taxable investments including bank FD's are providing such high pre-tax return!

One can open a PPF account in one's own name or on behalf of a minor of whom he is the guardian. While the minimum annual amount required to keep the account active is Rs 500, the maximum amount that can be deposited in a financial year is Rs 1.5 lakh. This is the combined limit of self and minor account.

PPF is a 15-year scheme, which can be extended indefinitely in a block of 5 years. It can be opened in a designated post office or a bank branch. It can also be opened online with few banks. One is allowed to transfer a PPF account from a post office to a bank or vice versa. A person of any age can open a PPF account. Even those with an EPF account can open a PPF account.

Whom it suits: PPF suits those investors who do not want volatility in returns akin to equity asset class. However, for long-term goals and especially when the inflation-adjusted target amount is high, it is better to take equity exposure, preferably through equity mutual funds, including ELSS tax saving funds and not solely depend on PPF.

3. EMPLOYEES' PROVIDENT FUND

Employees' Provident Fund (EPF) is another avenue that helps a salaried individual not only helps save tax through involuntary savings but also accumulate tax-free corpus. An employee contributes 12 percent of one's basic salary each month mandatorily towards his EPF account. An equal share is contributed by the employer but only a portion (3.67 percent) goes into EPF.

The employee's contributions qualify for tax benefit under Section 80C of the Income Tax Act, 1961, up to a limit of Rs 1.5 lakh a year but not the employer's share. Both, employee-employer share qualifies for interest as declared by the government each year which is tax-free in nature. The interest rate on EPF is currently at 8.65% for 2016-17 from the previous year's rate of 8.8%.

One may, however, increase one's own contribution up to 100 percent of basic and DA, to his VPF account and in doing so it becomes voluntary provident fund (VPF).

The VPF is a part of the EPF and all the rules remain the same. The interest earned on the EPF/VPF account is tax-exempt so long as the employee continues in employment for five continuous years or more.

Although one may opt-out from VPF by intimating one's employer, the money contributed towards VPF, which represents additional savings towards retirement, get locked-in for a longer tenure, and hence use the VPF route judiciously.

4. UNIT LINKED INSURANCE PLAN

Unit linked insurance plan (Ulip) is a hybrid product, a combo of protection and saving. It not only provides life insurance but also helps channel one's savings into various market-linked assets for meeting long-term goals.

In most Ulips, there are 5 to 9 fund options with varying asset allocation between equity and debt. A Ulip can have a duration of 15 or 20 years or more but the lock-in period is 5 years. The fund value on exiting the policy (allowed after 5 years) or on maturity is tax-free. Any switching between the fund's options irrespective of the holding period is exempt from tax.

Whom does Ulips suit: Ulips may not be suitable for all investors. Those investors who are comfortable in identifying and managing the ELSS schemes and simultaneously hold a pure term insurance plan, need not buy Ulips. Also, investors looking at investing in Ulips should make sure that the goal for which the Ulip savings is to be used is at least ten years away. For someone to exit Ulip after 5-7 years could be financially damaging.

5. Traditional insurance plans

Traditional insurance plans could be an endowment, money-back or a whole life plan. Unlike pure term insurance plans they have a savings element in them and come with a fixed term and a fixed sum assured. The premiums are based on the age at the time of entry, the life coverage and the period for which coverage is required. Premiums are to be paid each year till maturity. Few such plans have a limited premium payment option in which premiums are to be paid only for a specified term but the policy continues for long. For example, a policy of 25 years may require premiums to be paid only for the first 5 or ten years.

While the premium paid qualifies for tax benefit under section 80C, the maturity value and the death benefit is tax-free.



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Where traditional plans fail: Traditional plans are inflexible in nature. The term once chosen can't be changed. For someone who has started saving for say 20 years might need funds in the 16th or 19th year. Most such plans also do not allow partial withdrawals. Even sum assured can't be changed. The traditional insurance plans including endowment, money back or of any design have a potential for lower returns and is largely in the range of 4-7 percent per annum.

6. SUKANYA SAMRIDDHI YOJANA

Sukanya Samriddhi Yojana (SSY) is a small deposit scheme for the girl child launched as a part of the 'Beti Bachao

Beti Padhao' campaign. It is currently fetching an interest rate of 8.5 percent and provides income-tax benefit. A Sukanya Samriddhi Account can be opened any time after the birth of a girl till she turns 10, with a minimum deposit of Rs 1,000. A maximum of Rs 1.5 lakh can be deposited during the ongoing financial year. The account will remain operative for 21 years from the date of its opening or until the marriage of the girl after she turns 18.

Currently, SSY offers the highest tax-free return with a sovereign guarantee and comes with the exempt-exempt-exempt (EEE) status. The annual deposit (contributions) qualifies for Section 80C benefit and the maturity benefits are non-taxable.

LEATHER SCIENCE ABSTRACTS

VOLUME 50**NUMBER 05****MAY, 2017**



NATIONAL INFORMATION CENTER FOR LEATHER & ALLIED INDUSTRIES (NICLAI)
NATIONAL INFORMATION SYSTEM FOR SCIENCE & TECHNOLOGY (NISSAT)

CENTRAL LEATHER RESEARCH INSTITUTE
ADYAR, CHENNAI 600 020, INDIA

Leather Science Abstracts (**LESA**) is published by National Information Center for Leather and Allied Industries (**NICLAI**), Central Leather Research Institute (**CLRI**), Chennai.

It is a monthly abstracting periodical covering significant papers/articles published in the fields of Leather Science and Technology, Footwear Technology, Leatherware and Leathergoods, Leather chemicals, Leather machinery, Leather economics etc., appearing in about 500 scientific and technical periodicals published all over the world. The abstracts are presented under well defined subject headings and include indexes.

All enquiries for further details should be addressed to: THE DIRECTOR, (**ATTN.: EDITOR, LESA**)
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World Leather

LEATHER SCIENCE AND TECHNOLOGY

LEATHER INDUSTRY. HISTORY. MANAGEMENT. ECONOMICS. EDUCATION

50.15467

Indian salt industry : Present status, future growth and constraints. SINGH (YR), (Chamber of Indian Trade & Industry, Federation House, Tansen Marg, New Delhi-110 001, India). (Chem. Wkly.; 61, 5; 2015, Sep., 8; 208-10).

Discusses the present statuses of the salt, soda ash and caustic soda industries, growth of chlor-alkali industry, its anticipated growth, world scenario, challenges before the salt industry. It is expected that the CSIR-Central Leather Research Institute (CSIR-CLRI) which is run by the Government of India, should be involved in technical development of the Indian salt industry. (6 Tab.; 1 Photo).

50.15468

Invention and innovation for productivity & prosperity. GHARPURE (YH), (Technology Transfer Association, No. : 402, Manish Plaza, NIBM Road, Pune-411 048, Maharashtra State, India). (Chem. Wkly.; 61, 12; 2015, Oct., 27; 205-7).

Summarizes the phenomenon that involves basic research, development and innovation. Briefly discusses the accelerations in the changes of technologies, resistance to change, Indian Science and Technology; needs for several new inventors in science and technology as similarly to such inventors in foreign nations; relevances of such of them to suit Indian traditions and new ideas that have to be implanted for the Indian economic prosperity etc. It stresses the need for differentiating between invention and innovation and also for improving the existing production and productivity for better standard of life for the national tanning masses in addition to the need for striving for innovations in the areas of science and technology. (1 Tab.; 3 Photos).

50.15469

Science, technology and innovation : A perspective. GHARPURE (YH), (Technology Transfer Association, No. : 402, Manish Plaza, NIBM Road, Pune - 411 048, Maharashtra State, India). (Chem. Wkly.; 61, 4; 2015, Sep., 1; 217-8).

Discusses the origin of technology, Creativity, Patenting System etc. (2 Ref.; 3 Tab.; 1 Fig.).

50.15470

Technology, transfer & joint venture opportunities. GHARPURE (YH), (Technology Transfer Association, No. : 402, Manish Plaza, NIBM Road, Pune - 411 048, Maharashtra State, India). (Chem. Wkly.; 61, 4; 2015, Sep., 1; 219-20).

Lists the various resources that are available in India such as the acids, devices, joint venture opportunities as well as the resources that are sought for the vast industrial developments.

50.15471

Decisive role of Chinese chemical industry in the world. VENKATARAMAN (S), (M/s. Nandini Consultancy Services Private Limited, No. : M 60/1, 4th Cross Street, Besant Nagar, Chennai - 600 090, India). (Chem. Wkly.; 61, 11; 2015, Oct., 20; 193-5).

States that the present so called "global meltdown" has been attributed to the slowdown in the industrial and economic activities in China by several citizens across the world. Obviously, this implies that Chinese economy and industries have the most decisive roles in influencing global economic trends at present. Discusses in detail about the principal role of Chinese chemical industries, original and innovative initiatives, dimethyl ether (DME) safety and environmental issues and the Chinese chemical industries that continue to dominate. (2 Photos).

50.15472

Favorable demand outlook for fertilizers and agrochemicals. (Chem. Wkly.; 61, 6; 2015, Sep., 15; 217-20).

Discusses the overall economic outlooks for the fertilizers and agrochemicals and overviews both the global and Indian agriculture and food industries such as the fertilizers with special reference to urea and agrochemicals. Discusses about the other related agro-inputs/by-products such as seeds, dicalcium phosphate, sulphuric acid, Oleum and dimethyl sulphate. It is realized that the



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demand outlook for agri-input producers remains favorable over the medium to long-term. (1 Fig.; Photos).

50.15473

Indian pharmaceutical industry : Emerging markets offer attractive growth opportunities. RAY (S), DEWAN (S), KABRA (R), (ICRA Research Services, Registered office, No. : 1105 Kailash Building, 11th Floor, No. : 26 Kailash Gandhi Marg, New Delhi-110 001, India). (Chem. Wkly.; 61, 8; 2015, Sep., 29; 197-204).

Presents an update on key emerging markets(EMs) of Brazil, Russia and South Africa along with an update on Japan's generic drug industry, which is going through another phase of government-led manmade to increase generic penetration. The pro-generic reforms provide adequate opportunities for generic drug manufacturers as the several key drugs also expected to lose patent protection over the near-term. Currently, Indian companies have relatively limited presence in Japan given the stringent regulatory framework. However, they are expected to increase their focus going forward. (5 Tab.; 1 Fig.; 2 Photos).

50.15474

APIs & their intermediates : In search of a paradigm shift. RANADHEER REDDY (B), (No. : 880, Vivekananda Nagar, Kukatpally, Hyderabad-500 072, Telengana State, India). (Chem. Wkly.; 61, 7; 2015, Sep., 22; 26).

Stresses the need of leaders in industry with long-term vision and support from all stockholders in addition to possessing the technical competency and basic infrastructure. It will be interesting to wait and see industry and Government collaborate and deliver the promised paradigm shift.

50.15475

Status of storage & distribution of hazardous chemicals in India-way forward. ARYA (V), (M/s. Rhenus Logistics India(P) Limited, No. : 9 C&D, P M Towers, 37 Greaves Road, Chennai-600 006, India). (Chem. Wkly.; 61, 7; 2015, Sep., 22; 222-3).

Discusses the importance of knowing one's customer and the chemical very well before storage and distribution of the same.

50.15476

Get our (beam) house in order. REDWOOD (M), (M/s. "Leather Naturally", No. : 15303 Madison Avenue, Lakewood, Ohio 44107, USA). (New Innov. LeatherChem.; 8; 2015; 06 & 08).

Issues a call to arms for the industry to stand up to the critics including even some within the ranks in the beamhouse-who are using sustainability and best practices misguided weapons of choice as despite evidence to the contrary, the leather industry is still criticized by people using misconceptions and erroneous evidence.

50.15477

Sustainability-The passport to our future. TEGTMEYER (D), (J. Am. Leather Chem. Assoc.; 110, 8; 2015, Aug.; 240-50).

Speaks about the ultimate end where will all the developments that have been made by all the developers throughout the world. Indicated that unfortunately they have been so far focused during this rapid innovation and development process both public health and the environment suffered. Discussed the sustainability issues the world is currently facing; evolution of current understanding of sustainability; technology cycles and future predictions, paradigm shifts for economy and for companies; important role of politics and position of the leather industry. (5 Ref.; 7 Charts).

50.15478

New generation green metrics : Key to commercial green innovation. RAJAGOPAL (R), (M/s. "Chemical Weekly", Corporate Office, No. : 6th Floor, B-Wing, Godrej Coliseum, Behind Evarard Nagar, Off. Eastern Express Highway, K.J. Somaiya Hospital, Road, Sion(East), Mumbai-400 022, India). (Chem. Wkly.; 61, 8; 2015, Sep., 29; 205-8).

Discusses the need for validated and reliable metrics that has become very critical in design and development of greener products and processes with ever increasing claims of greenness from all sources. The practice of such green washing for short-term gains has led to loss of reputation for several companies working in the green domains. In simple terms green washing refers to the act of misleading consumers regarding the environmental practices of a company or the environmental benefits



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of a product or service. Discusses also the new methodologies that have at present becoming the possibility for monitoring, management and evaluation by having an unified set of sustainability metrics embedded within the CHEM21 project. The toolkit gives an indication if new chemistries are greener than those currently in use. It also helps in the process of analyzing their chemistries as an educational tool thus finding hot spots and making improvements and support the training of chemists. (13 Ref.; 2 Tab.; 1 Fig.; 1 Photo).

50.15479

Circular economics and renewable sources. PAULI (G), (World Leather; 28, 5; 2015, Oct.; 12).

It is looked at economies and commented that the green economy has struggled because green products are too expensive-What's good for the human beings should be cheap and free. What kind of economy is it if what's good for the human beings is expensive and what's bad for the human beings is cheap? Describes processes using cheap raw materials and gives examples. It is stated that the author may be unique in not believing that the use of leather is not all bad amongst the green brigade.

50.15480

What will it take for India to become a global manufacturing hub? (Chem. Wkly.; 61, 22; 2015, Oct., 27; 209-12).

Discusses that in the longer periods, global factors such as exchange rates and other countries' policies and intrinsic factors such as wage differentials will become less favorable to India, which implies that it has a limited window of opportunity years to accelerate reforms that can harness its advantage to create an industrial revolution and become a global manufacturing superpower. (2 Photos).

50.15481

Research in nanoscience and nanotechnology. GHOSH (NN), (Department of Chemistry, Birla Institute of Technology and Science(BITS), KK Birla Goa Campus, National Highway 17B Bypass Road, Zurainagar, Goa-403 726, India). (Chem. Wkly.; 61, 5; 2015, Sep., 8; 217-8).

Discusses the major research activity that involves development of various methodologies, which are novel but simple and cost-effective, for preparation

of nanostructured materials and their applications. (2 Photos).

50.15482

Spurious/counterfeit pesticides in India : Realities & implications. (Chem. Wkly.; 61, 9; 2015, Oct., 6; 209-18).

Provides some of the key findings of the study, which have implications for farmers, the agrochemicals industry, the government and the common man. (3 Tab.; 6 Fig.; 2 Photos).

RAW HIDES AND SKINS

50.15483

Early detection of looseness in bovine hides using ultrasonic imaging. WELLS (HC), HOLMES (G), HAVER KAMP (RG), (School of Engineering and Advanced Technology, Massey University, Private Bag 11222, Palmerston North 4442, New Zealand). (J. Am. Leather Chem. Assoc.; 111, 3; 2016, Mar.; 107-12).

Discusses the processing of bovine hides to leather that results in a significant preparation of defective leather known as loose leather. It has not previously been possible to recognize hides that may produce loose leather. Hides were processed through to leather with samples retained at the pickle, wet blue and crust leather stages with material that resulted in loose leather compared with that resulting in tight leather, using ultrasonic imaging. The loose precursor is characterized by a lower density of material in the mid grain layer. The looseness is quantified by amplitude differences in ultrasound line scans or cross-sectional area scans between loose leather and tight leather with 2-4 times the amount of low intensity area in loose leather at all three process stages. This enables the detection of hides that will result in loose leather and may enable unsuitable hides to be diverted to other process streams to save substantial processing costs. (10 Ref.; 1 Tab.; 17 Fig.).

PROTEINS AND COLLAGEN

50.15484

Controlling radical formation in the photoactive yellow protein chromophore. MOONEY (CRS), PARKES (MA), ISKRA (A), FIELDING (HH), (Department of Chemistry,



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University College London, No. : 20 Gordon Street, London WC1H 0AJ, England). (Angew.Chem.; 54, 19; 2015, May, 4; 5646-9).

Stresses the necessity of understanding the photoresponse of the chromophore for understanding how photoactive proteins function. Photoactive yellow protein(PYP) is a phototypical signaling protein. But light triggers trans-cis isomerization of the chromophore covalently bound within PYP as the first step in a photocycle that results in the host bacterium moving away from potentially harmful light. At high energies, photoabsorption has the potential to create radicals and free electrons; however, this process is largely unexplored. Photoelectron spectroscopy and quantum chemistry calculations have been used to show that the molecular structure and conformation of the isolated PYP chromophore can be exploited to control the competition between trans-cis isomerization and radical formation. An evidence is also found to suggest that one of the roles of the protein is to impede radical formation in PYP by preventing torsional motion in the electronic ground state of the chromophore. (28 Ref.; 6 Fig.).

50.15485

Photothermally induced local dissociation of collagens for harvesting of cell sheets. KIM (JD), HEO (JS), PARK (T), PARK (C), KIM (HO), KIM (E), (Active Polymer Center for Pattern Integration and Department of Chemical and Biomolecular Engineering, Yonsei University, Yonsei-ro 50, Seodaemun-gu, Seoul 120-749, Republic of Korea). (Angew.Chem.; 54, 20; 2015, May, 11; 589-73).

Describes the local heating of poly (3,4-ethylenedioxythiophene) (PEDOT) by a photothermal effect directed by near-infrared(NIR) light induced unfolding of adsorbed collagen triple helices, yielding soluble collagen single-helical structures. This dissociation of collagens allowed the harvesting of a living idiomorphic cell sheet, achieved upon irradiation with NIR light($\lambda = 808$ nm). The PEDOT layer was patterned and cells were successfully cultured on the patterned surface. Cell sheets of various shapes mirroring the PEDOT pattern could be detached after a few minutes of irradiation with NIR light. The PEDOT patterns guided not only the entire shape of the cell sheets but also the spreading direction of the cells in the sheets. This photothermally induced dissociation of collagen provided a fast non-invasive harvesting method and tailor-made cell sheet patterns. (30 Ref.; 23 Fig.).

ENZYMOLGY

50.15486

A promiscuous De Novo Retro-Aldolase catalyzes asymmetric Michael additions via Schiff base intermediates. GARRABOU (X), BECK (T), HILVERT (D), (Laboratory of Organic Chemistry, ETH Zurich, 8093 Zurich, Switzerland). (Angew.Chem.; 54, 19; 2015, May, 4; 5609-12).

Discusses the recent advances in computational design that has enabled the development of primitive enzymes for a range of mechanically distinct reactions. It is shown here that the rudimentary active sites of these catalysts can give rise to useful chemical promiscuity. Specifically, RA95.5-8, designed and evolved as a retro-aldolase, also promotes asymmetric Michael additions of carbanions to unsaturated ketones with high rates and selectivities. The reactions proceed by amine catalysts, as indicated by mutagenesis and X-ray data. The inherent flexibility and tenability of this catalyst should make it a versatile platform for further optimization and/or mechanistic diversification by directed evolution. (35 Ref.; 2 Fig.; 2 Schemes).

50.15487

Composition, structure and properties of immunized hair from hair-saving unhairing process. KONG (L), ZHANG (J), CHEN (W), (Key Laboratory of Leather Chemistry and Engineering of Ministry of Education, Sichuan University, Chengdu 610065, People's Republic of China and National Engineering Laboratory of Leather Manufacture, Wangjiang Campus, Section No. : 24 of Southern Yichuan, Chengdu 610065, Sichuan Province, People's Republic of China). (J. Soc. Leather Technol. Chem.; 99, 3; 2015, May-Jun.; 124-5).

Describes the immunized cattle hair from a hair-saving unhairing process that had been observed by Scanning Electron Microscope(SEM) and Atomic Force Microscope(AFM) and analyzed the elements in the context by Energy Disperse X-ray Spectroscopy(EDS) while the original hair was used as control. Compared the differences of resistance to acid, alkali, oxidant and enzyme between immunized hair and original hair. Calcium and magnesium were found in the immunized hair, while the content of sulfur decreased slightly; the antioxidant property of the immunized hair was improved greatly, but the acid resistance, alkali resistance and enzyme resistance were reduced significantly. In general,



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the composition, structure and properties of the immunized hair showed great changes after hair-saving unhairing process, these changes form the basis for the utilization of the immunized hair. (9 Ref.; 3 Tab.; 8 Fig.).

50.15488

SBA-15-oxynitrides as a solid-base catalyst : effect of nitridation of catalytic activity. BALJEET SINGH, MOTE (KR), GOPINATH (CS), MADHU (PK), POLSHETTIWAR (V), (Department of Chemical Sciences, Tata Institute of Fundamental Research(TIFR), HomiBhabha Road, Navy Nagar, Colaba, Mumbai-400 005, India). (Angew.Chem.; 54, 20; 2015, May, 11; 5985-9).

Describes the solid bases, such as SBA-15-oxynitrides, that have attracted considerable interest for potential applications as catalysts in important industrial processes. Reported herein is that by simply tuning the temperature of nitridation(ammionolysis), the catalytic activity of these solid bases can be enhanced. Solid-state NMR(nuclear magnetic resonance) spectroscopy and XPS(X-ray photoelectron spectroscopy) studies provided the reasoning behind this change in activity. (25 Ref.; 1 Tab.; 24 Fig.; 2Schemes).

50.15489

Enzymatically active ultrathin pepsin membranes. RAAIJMAKERS (MJT), SCHMIDT (T), BARTH (M), TUTUS (M), BENES (NE), WESSLING (M), (Inorganic Membranes, University of Twente, Faculty of Science and Technology, MESA+ Institute for Nanotechnology, P.O. Box 217, 7500 AE Enschede, The Netherlands). (Angew.Chem.; 54, 20; 2015, May, 11; 5910-4).

Describes the enzymatically active proteins that enable efficient and specific cleavage reactions of peptide bonds. Cova1ent coupling of the enzymes permits immobilization, which in turn reduces autolysis-induced deactivation. Ultrathin pepsin membranes were prepared by facile interfacial polycondensation of pepsin and trimesoyl chloride. The pepsin membrane allows for simultaneous enzymatic conversion and selective removal of digestion products. The large water fluxes through the membrane expedite the transport of large molecules through the pepsin layers. The presented method enables the large-scale production of ultrathin, cross-linked, enzymatically active membranes. (20 Ref.; 5 Fig.; 1 Scheme).

POST-TANNING

50.15490

A new marking system for leather based on encapsulated DNA. STENZEL (S), BOHRISCH (J), PACH (M), MEYER (M), (Research Institute of Leather and Plastic Sheetting, Department Leather / Biopolymers, Meissner Ring 1-5, 09599 Freiberg, Germany). (J. Am. Leather Chem. Assoc.; 110, 9; 2015, Sep.; 277-87).

Discusses the use of synthetic deoxyribonucleoroacid (DNA) as a marking system is a new traceability concept in the leather industry, especially for supplier and batch tracing. DNA is outstandingly suited for the usage as a masking system because of its code diversity, invisibility and doubtlessness. However, DNA labeling is a great challenge for products exposed to DNA damaging influences during their production, such as acidic pH, elevated temperatures in combination with high humidity or sunlight radiation. Leather is such a product. Single-strand DNA(ssDNA) to hydroxyapatite is attached and enhanced the stability of these DNA particles by encapsulation in polystyrene-co-divinylbenzene(PS-DVB) microcapsules. Furthermore, the ssDNA containing microcapsules were improved with functional groups on the surface of the capsule to irreversibly attach them to the collagen matrix of leather by chrome tanning. Laboratory scale tests using acidic conditions as well as elevated temperatures in the presence of high humidity showed the enhancement of the stability of the leather marking system. Conducted the marking trials in crust leathers and tested the light fastness of these labeled crusts. The results indicate that encapsulated DNA-hydroxyapatite-particles are more stable at sunlight radiation than non-encapsulated DNA. These marking trials showed that the system could be a suitable leather marking system in the leather industry to establish a powerful supplier and batch tracing. (25 Ref.; 1 Tab.; 12 Fig.; 2 Schemes).

LEATHER CHEMICALS AND AUXILIARIES

50.15491

Rhodium(II)-catalyzed regiospecific dimerization of aromatic acids : Two direct C-H bond activation in water. GONG (H), ZENG (H), ZHOU (F), LI (C), (Department of Chemistry and FQRNT, Center for Green Chemistry and



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Catalysis, McGill University, 801 Sherbrooke Street West, Montreal, Quebec H3A 0B8, Canada). (Angew.Chem.; 54, 19; 2015, May, 4; 5718-21).

Describes 2,2'-diaryl acids that are key building blocks for some of the most important and high-performance polymers such as polyesters and polyamides(imides), as well as structural motifs of MOFs(metal-organic frameworks) and biological compounds. Discovered a direct, regiospecific and practical dimerization of simple aromatic acids to generate 2,2'-diaryl acids, that proceeds through two rhodium-catalyzed C-H(Carbon-Hydrogen) activation in water. This reaction can be easily scaled up to gram level by using only 0.4-0.6 mol% of the rhodium catalyst. As a proof-of-concept, the natural product ellagic acid was synthesized in two steps by this method. (71 Ref.; 2 Tab.; 1 Fig.; 4 Schemes).

50.15492

Nickel-catalyzed monofluoromethylation of aryl boronic acids. SU (Y), FENG (G), WANG (Z), LAN (Q), WANG (X), (Department of Chemistry, University of Science and Technology of China, No. : 96, JinZhai Road, Bache District, Hefei 230026, China). (Angew.Chem.; 54, 20; 2015, May, 11; 6003-7).

Describes the aryl boronic acids that can be monofluoromethylated under nickel catalysis. Demonstrates the utility of this method by the monofluoromethylation of a borylated and acyl-protected derivative of the statin drug ezetimibe. Mechanistic investigations indicate that a fluoromethyl radical is involved in the Ni^{II}/Ni^{III} catalytic cycle. (71 Ref.; 1 Tab.; 7 Schemes).

50.15493

Visible-light-mediated Chan-Lam coupling reactions of aryl boronic acids and aniline derivatives. YOO (W), TSUKAMOTO (T), KOBAYASHI (S), (Department of Chemistry, School of Science, The University of Tokyo, Hongo, Bunkyo-ku, Tokyo 113-0033, Japan). (Angew.Chem.; 54, 22; 2015, May, 26; 6587-90).

Describes the copper(II)-catalyzed aerobic oxidative coupling reaction between aryl boronic acids and aniline derivatives that was found to be improved significantly under visible-mediated photoredox catalysis. The substrate scope of this oxidative Chan-Lam reaction was

thus expanded to include electron-deficient aryl boronic acids as visible starting materials. (51 Ref.; 2 Tab.; 1 Scheme).

50.15494

Palladium(II)/Brønsted acid-catalyzed enantioselective oxidative carbocyclization-borylation of enalles. JIANG (T), BARTITOLOMEY (T), MAZUELA (J), WILLERSINN (J), BACKVALL (J), (Department of Organic Chemistry, Arrhenius Laboratory, Stockholm University, Stockholm SE-10691, Sweden). (Angew.Chem.; 54, 20; 2015, May, 11; 6024-7).

Describes the development of an enantioselective oxidative carbocyclization-borylation of enallenesthat is catalyzed by palladium(II) and a Brønsted acid. Biphenol-type chiral phosphoric acids were superior co-catalysts for inducing the enantioselective cyclization. A number of chiral borylated carbocycles were synthesized in high enantiomeric excess(ee). (74 Ref.; 2 Tab.; 1 Scheme).

50.15495

Amphipathic DNA origami nanoparticles to scaffold and deform lipid membrane vesicles. CZOGALLA (A), KAUERT (D.J), FRANQUELIM (H.G), UZUNOVA (V), ZHANG (Y), SEIDEL (R), SCHWILLE (P), (Department of Cellular and Molecular Biophysics, Max Planck Institute of Biochemistry, AmKlopferspitz 18, 821 Martinsried, Germany). (Angew.Chem.; 54, 22; 2015, May, 26; 6501-5).

Reports a synthetic biology - inspired approach for the engineering of amphipathic DNA (deoxyribonucleoic acid) origami structures as membrane - scaffolding. The structures have a flat membrane-binding interface decorated with cholesterol-derived anchors. Sticky oligonucleotide overhangs on their side facets enable lateral interactions leading to the formation of ordered arrays on the membrane. Such a tight and regular arrangement makes the authors' DNA origami capable of deforming free-standing lipid membranes, mimicking the biological activity of coat-forming proteins, for example, from the I-/F-BAR(Bin-Amphiphysin-Rvs) family. (34 Ref.; 14 Fig.).

50.15496

Identification of covalent bromodomain binders through DNA display of small molecules. DAGUER (J), ZAMBALDO (C), ABEGG (D), BARLUENGA (S), TALLANT (C), MÜLLER (S), ADIBEKIAN (A), WINSSINGER (N), (School of Chemistry and



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Biochemistry, NCCR Chemical Biology, University of Geneva, No. : 30 quai Ernest-Ansermet, Geneva, Switzerland). (Angew. Chem.; 54, 20; 2015, May, 11; 6057-61)

Discusses the regulation of transcriptional programs by epigenetic readers(bromodomains) has been linked to the development of several pathologies. Notably, it has been implicated in the regulation of cellular growth and evasion of apoptosis, in cancer as well as in inflammation. The discovery of small-molecule probes to dissect the role of bromodomains is thus important. Demonstrates that specific cysteine residues conserved across the bromodomains can be harnessed for covalent trapping. Reports the discovery of two small molecules that form a covalent bond with cysteine residues conserved across the bromodomain family, analyze the subset of bromodomains that can be addressed through covalent binding and show proteomic analyses enabled by the enrichment of bromodomains from nativelysates. (33 Ref.; 7 Fig.).

50.15497

Structural transformation : assembly of an otherwise inaccessible DNA nanocage. LI (Y), TIAN (C), LIU (Z), JIANG (W), MAO (C), (Department of Chemistry, Purdue University, No. : 610 Purdue Mall, West Lafayette, Indiana 47907, USA). (Angew.Chem.; 54, 20; 2015, May, 11; 5990-3).

Describes a strategy of structural transformation for the assembly of DNA (deoxyribonucleoroacid) nanocages that cannot be assembled directly. In this strategy, a precursor DNA nanocage is assembled first and then is isothermally transformed into a desired, complicated nanocage. A dramatic, conformational change accompanies the transformation. This strategy has been proven to be successfully by native polyacrylamide gel electrophoresis(PAGE) and cryogenic electron microscopy(cryoEM) imaging. Expected that the strategy of structural transformation will be useful for the assembly of many otherwise inaccessible DNA nanostructures and help to increase the structural complexity of DNA nanocages. (29 Ref.; 13 Fig.).

50.15498

A signal-passing DNA-strand-exchange mechanism for active self-assembly of DNA nanostructures. PADILLA (JE), SHA (R), KRISTANSEN (M), CHEN (J), JONOSKA (N), SEEMAN (NC), (Department of Chemistry, New York University, Silver Center for Arts and Science, No. : 100 Washington Square

East, 15th Floor, New York 10003, USA). (Angew.Chem.; 54, 20; 2015, May, 11; 5939-42).

Describes the DNA (deoxyribonucleoroacid) nanostructured tiles which play an active role in their own self-assembly in the system whereby they initiate a binding event that produces a cascading assembly process. Presents DNA tiles that have a simple but powerful property : they respond to a binding event at one end of the tile by passing a single across the tile to activate a binding site at the other end. This action allows sequential, virtually irreversible self-assembly of tiles and enables local communication during the self-assembly process. This localized signal-passing mechanism provides a new element of control for autonomous, self-assembly of DNA nanostructures. (34 Ref.; 12 Fig.).

50.15499

Glycopeptide mimetics recapitulate high-Mannose-type oligosaccharide binding and function. LUSVARGHI (S), GHIRLANDO (R), WONG (C), BEWLEY (CA), (Laboratory of Bioorganic Chemistry, National Institute of Diabetes and Digestive and Kidney Diseases, No. : 31, Center Drive, Bethesda, Maryland 20892, USA). (Angew.Chem.; 54, 19; 2015, May, 4; 5603-8).

Describes the high-mannase-type glycans(HMTGs) decorating viral spike proteins as targets for virus neutralization. Stated that the multivalency is important for high avidity binding and patent inhibition. Designed theglycopeptide HTMG mimetics with systematically varied mannasevalency and spacing for defining the defining the chemical determinants controlling multivalent interactions. Identified the glycopeptides that fully recapitulate the specificity and kinetics of binding to Man₇GlcNAc₂Asn and a synthetic nonamannoside by NMR(nuclear magnetic resonance) spectroscopy, SPR(surface plasmon resonance), analytical UC (ultracentrifugation) and microcalorimetry by using the potent antiviral lectin griffithsin(GRFT). It is found that mannose spacing and valency intermolecular binding mode. Surprisingly, although face-to-face interaction are of higher affinity, intermolecular interactions are longer lived. These findings yield key insights into mechanisms involved in glycan-mediated viral inhibition. (18 Ref.; 1 Tab.; 14 Fig.).

50.15500

Controlling theory origins of inflammation with a photoactive lipopeptideimmunopotentiator. MANCINI



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(RJ), STOTTS (L), MOORE (T), ESSER-KAHN (AP), (Department of Chemistry, University of California, No. : 1102 Natural Sciences II, Irvine, California 92697, USA). (Angew.Chem.; 54, 20; 2015, May, 11; 5962-5).

Discusses the inflammatory responses which are mediated by signaling molecules that are both produced by and recognized across highly heterogeneous cell populations. As such, the study of inflammation using traditional immunostimulants is complicated by paracrine and acetocrine signaling, which obscures the origin of a propagating response. Describes the development of a small-molecule probe that can photosensitize immune cells, thus allowing light-mediated inflammation for addressing this challenge. This probe was used to control the origin of inflammation using light. Inflammation was initiated from fibroblasts or dendritic cells by following this motif. Reported the contributions of fibroblasts and dendritic cells in initiating inflammation in heterogeneous co-culture, thus providing insights into the future development of vaccines and treatment of inflammation. (32 Ref.; 7 Fig.; 1 Scheme).

50.15501

Targeted histone peptides : insights into the spatial regulation of the methyltransferase PRC2 by using a surrogate of heterotypic chromatin. BROWN (ZZ), MÜLLER (MM), KONG (HE), LEEWIS (PW), MUIR (TW), (Department of Chemistry, Princeton University, Princeton, New Jersey 08544, USA). (Angew.Chem.; 54, 22; 2015, May, 26; 6457-61).

Describes the eukaryotic genomes as dynamically regulated through a host of epigenetic stimuli. The substrate for these epigenetic transactions, chromatin, is a polymer of nucleosome building blocks. Each nucleosome can differ from its neighbors as a result of covalent modifications to both the deoxyribonucleic acid (DNA) and the histone packaging proteins. The heterotypic nature of chromatin presents a formidable obstacle to biochemical studies seeking to understand the role of context on epigenetic regulation. Introduced a chemical approach to the production of heterotypic chromatin that can be used in such studies. This method involves the attachment of an user-defined modified histone peptide to a designated nucleosome within the polymer by using a peptide nucleic acid (PNA) targeting compound. This strategy was applied to dissect the effect of chromatin context on the activity of the histone methyltransferase PRC2. The results show that PRC2 can be stimulated to produce histone H3 methylation from a defined nucleation site. (19 Ref.; 8 Fig.; 1 Scheme).

50.15502

Intracellular discovery of peptidyl ligands by reversible cyclization : Discovery of a PDZ domain inhibitor that rescues CFTR activity. QIAN (Z), XU (X), AMACHER (JF), MADDEN (DR), CORMET-BOYAKA (E), PEI (D), (Department of Chemistry and Biochemistry, The Ohio State University, No.: 484 West 12th Avenue, Ohio 43210, USA). (Angew.Chem.; 54, 20; 2015, May, 11; 5874-8).

Describes a general strategy that has been developed for the intracellular delivery of linear peptidyl ligands through fusion to a cell-penetrating peptide and cyclization of the fusion peptides via a disulfide bond. The resulting cyclic peptides are cell permeable and have improved proteolytic stability. Once inside the cell, disulfide bond is reduced to produce linear biologically active peptides. This strategy was applied to generate a cell-permeable peptide substrate for real-time detection of intracellular caspase activities during apoptosis and an inhibitor for the CFTR (Cystic fibrosis transmembrane conductance regulator)-associated ligand (CAL) PDZ domain as a potential treatment for cystic fibrosis. (30 Ref.; 1 Tab.; 10 Fig.).

50.15503

High catalytic activity of heteropolynuclear cyanide complexes containing cobalt and platinum ions : visible-light driven water oxidation. YAMADA (Y), DYAMA (K), GATES (R), FUKUZUMI (S), (Department of Material and Life Sciences, Graduate School of Engineering, Osaka University, 2-1 Yamada-oka, Suita, Osaka 565-0871, Japan). (Angew.Chem.; 54, 19; 2015, May, 4; 5613-7).

Describes a near stoichiometric amount of O₂ (oxygen) that was evolved as observed in the visible-light irradiation of aqueous buffer (pH 8) containing [Ru(Ruthenium)^{II}(2,2'-bipyridine)₃] as a photosensitizer, Na₂S₂O₈ (sodium persulfate) as a sacrificial electron acceptor and a heteropolynuclear cyanide complex as a water-oxidation acceptor and a heteropolynuclear cyanide complex as a water-oxidation catalyst. Discussed the heteropolynuclear cyanide complex exhibited higher catalytic activity than a polynuclear cyanide complex containing only Co^{II} (Carbon monoxide II) or Pt^{IV} (Platinum IV) ions as C (Carbon)-bound metal ions. The origin of the synergistic effect between Co and Pt in relation to electronic and local atomic structure of the complexes. (41 Ref.; 25 Fig.; 1 Scheme).



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50.15504

The double-histidine Cu^{2+} -binding motif : a highly rigid, site-specific spin probe for electron spin resonance distance measurements. CUNNINGHAM (TF), PUTTERMAN (MR), DESAI (A), HOME (WS), SAXENA (S), (Department of Chemistry, University of Pittsburgh, No. : 219 Parkman Avenue, Pittsburgh, Pennsylvania 15260, USA). (Angew.Chem.; 54, 21; 2015, May, 18; 6330-4).

Describes the development of ESR(electron spin resonance) methods that measure long-range distance distributions that advanced biophysical research. However, the spin labels commonly employed are highly flexible, which leads to ambiguity in relating ESR measurements to protein-backbone structure. Presents the double-histidine(dHis) Cu^{2+} (Copper (II))-binding motif as a rigid spin probe for double electron-electron resonance(DEER) distance measurements. Assembled the spin label *in situ* from natural amino acid residues and a metal salt, requires no postexpression synthetic modification and provides distance distributions that are dramatically narrower than those found with the commonly used protein spin label. Simple molecular modelling based on a X-ray crystal structure of an unlabeled protein led to a predicted most probable distance with 0-5 Å of the experimental value. Cu^{2+} DEER with the dHis motif shows great promise for the resolution of precise, unambiguous distance constraints that relate directly to protein-backbone structure and flexibility. (63 Ref.; 7 Fig.).

50.15505

Distance measurement on an endogenous membrane transport in *Escherichia coli* cells and native membranes using EPR spectroscopy. JOSEPH (B), SIKORA (A), BORDIGNON (E), JESCHKE (G), CAFISO (DS), PRISNER (TF), (Department of Chemistry, University of Virginia, McCormick Road, Charlottesville, Virginia 22904-4319, USA). (Angew.Chem.; 54, 21; 2015, May, 18; 6196-9).

Describes the membrane proteins that may be influenced by the environment and they may be unstable in detergents or fail to crystallize. As a result, approaches to characterize structures in a native environment are highly desirable. Reports a novel general strategy for precise distance measurements or outer membrane proteins in whole *Escherichia coli* cells and isolated outer membranes. Overexpressed the cobalamin transporter BtuB and spin-labeled in whole cells and outer membranes and interspin distances were measured to a

spin-labeled cobalamin using pulse EPR(electron paramagnetic resonance) spectroscopy. A comparative analysis of the data, reveals a similar interspin distance between whole cells, outer membranes and synthetic vesicles. This approach provides an elegant way to study conformational changes or protein-protein/ligand interactions at surface-exposed sites of membrane protein complexes in whole cells and native membranes and provides a method to validate outer membrane protein structures in their native environment. (26 Ref.; 8 Fig.).

50.15506

Next-generation sequencing as input for chemometrics in different sensing routines. GOODWIN (S), GADE (AM), BYROM (M), HERRERA (B), SPEARS (C), ANSLYM (EV), ELLINGTON (AD), (Department of Chemistry, A1590, The University of Texas at Austin, Texas 78712, USA). (Angew.Chem.; 54, 21; 2015, May, 18; 6339-42).

Describes the differential sensing(DS) methods that traditionally use spatially arranged receptors and optical signals to create score plots from multivariate data which classify individual analytes or complex mixtures. Describes also a new approach, in which nucleic acid sequences and sequence counts are used as the multivariate data without the necessity of a spatial array. Previously selected aptamers, identified from the literature were used as semi-specific receptors, Next-Gen deoxyribonucleoroacid (DNA) sequencing was used to generate data and cell line differentiation was the test-bed application for demonstrating this approach to DS. The study of a principal component analysis loading plot revealed cross-reactivity between the aptamers. The technique generates high-dimensionality score plots and should be applicable to any mixture of complex and subtly different analytes for which nucleic acid-based receptors exist. (35 Ref.; 3 Fig.).

50.15507

Activation of water in titanium-dioxide photocatalysts by formation of surface hydrogen bonds : an *in-situ* IR spectroscopy study. SHENG (H), ZHANG (H), SONG (W), JI (H), MA (W), CHEN (C), ZHAO (J), (Key Laboratory of Photochemistry, National Laboratory for Molecular Sciences, Institute of Chemistry, Chinese Academy of Sciences(CAS), No. : 2 1st North Street, Zhongguancun, Beijing 100190, China). (Angew.Chem.; 54, 20; 2015, May, 11; 5905-9).



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Describes the hole-driving oxidation of titanium-coordinated water molecules on the surface of TiO_2 (titanium oxide) as both thermodynamically and kinetically unfavorable. The water can be activated to realize its oxidation by avoiding the direct coordinative adsorption of water molecules to the surface Ti (Titanium) sites. The first-layer water adsorption mode is switched from Ti coordination to a dual H-bonding adsorption on adjacent surface F sites when TiO_2 surface is covered by the H (Hydrogen)-bonding acceptor F. Detailed *in situ* IR (Infrared) spectroscopy and isotope-labeling studies reveal that the adsorbed water molecules by dual H-bonding can be oxidized to O_2 even in the presence of any electron scavengers. Proposes the formation of the dual H-bonding structure can not only enable the hole transfer to the water molecules thermodynamically, but also facilitate kinetically the cleavage of O-H (Oxygen-Hydrogen) bonds by proton-coupled electron transfer process during water oxidation. (27 Ref.; 7 Fig.; 2 Schemes).

50.15508

Self-immolative poly(4,5-dichlorophthalaldehyde) and its application in multi-stimuli-responsive macroscopic plastics. DiLAURO (AM), LEWIS (GG), PHILIPS (ST), (Department of Chemistry, The Pennsylvania University, University Park, Pennsylvania 16802, USA). (Angew.Chem.; 54, 21; 2015, May, 18; 6200-5).

Describes the end-capped poly (4,5 - dichlorophthalaldehyde) (PCl_2PA), which is a new self-immolative CD_r (polymer which is capable of continuous deployment) polymer with the unique capability of depolymerizing continuously and completely in the solid state when an end cap is cleaved from the polymer by reaction with a specific molecular signal. End-capped poly(4,5-dichlorophthalaldehyde) is sufficiently stable to enable patterning of three-dimensional macroscopic polymeric materials by selective laser sintering. These unique materials are capable of 1) autonomously amplifying macroscopic changes in the material in response to specific molecular inputs and 2) altering their responses depending on the identity of the applied signal. Thus, not only does end-capped PCl_2PA provide new and unique capabilities compared to the small subset of existing CD_r polymers, but it also provides access to a new class of stimuli-responsive materials. (41 Ref.; 8 Fig.; 1 Scheme).

50.15509

Ammonia activation by a nickel NCN-pincer complex featuring a non-innocent N-heterocyclic carbene : ammine and amido complexes in equilibrium. BROWN

(RM), GARCIA (JB), VALIJUS (J), ROBERTS (CJ), TUONONEN (HM), PARVEZ (M), ROESLER (R), (Department of Chemistry, University of Calgary, 2500 University Drive Northwest, Calgary, Alberta T2N 1N4, Canada). (Angew.Chem.; 54, 21; 2015, May, 18; 6274-7).

Describes the synthesis of a $\text{Ni}(\text{O})(\text{Nickel-o-tolyl})\text{Cl-NCN}(2,6\text{-bis}(\text{dimethylamino})\text{methyl})$ phenyl anion pincer complex featuring a six membered N-heterocyclic carbene (NHC) central platform and amidine pendant arms by deprotonation of its $\text{Ni}(\text{II})$ precursor. It retained chloride in the square-planar coordination sphere of nickel and was expected to be highly susceptible to oxidative addition reactions. The $\text{Ni}(\text{O})$ complex rapidly activated ammonia at room temperature, in a ligand-assisted process where the carbene carbonation played by the unprecedented role of proton acceptor. Observed the coordinated (ammine) and activated (amido) species together in solution, in a solvent-dependent equilibrium for the first time. A structural analysis of the Ni complexes provided insight into the highly unusual, non-innocent behavior of the NHC ligand. (48 Ref.; 3 Fig.; 2 Schemes).

50.15510

Palladium-catalyzed hydrocarboxylation of alkynes with formic acid. HOU (J), XIE (J), ZHOU (Q), (State Key Laboratory and Institute of Elemento-Organic Chemistry, Collaborative Innovation Center of Chemical Science and Engineering (Tianjin), Nankai University, No. : 9 Weijin Road, Nankai Qu, Tianjin 300071, China). (Angew.Chem.; 54, 21; 2015, May, 18; 6302-5).

Describes the development of a palladium-catalyzed hydrocarboxylation of alkynes with formic acid. This method provides acrylic acid and derivatives in good yields with high regioselectivity without the need to handle toxic CO gas. (26 Ref.; 2 Tab.; 5 Fig.; 2 Schemes).

FINISHING MATERIALS

50.15511

Linearly tunable emission colors obtained from a fluorescent-phosphorescent dual-emission compound by mechanistic stimuli. MAO (Z), YANG (Z), WANG (Y), CHI (Z), LO (C), LIU (S), LIEN (A), XU (J), (PCFM Laboratory, GDHPPC Laboratory, KLGHEI of Environment and Energy Chemistry, State Key Laboratory of Optoelectronic Material and Technologies, School of Chemistry and Chemical Engineering, Sun Yatsen University, No. : 135 Xingang West Road, Binjiang Lu, Haizhu One,



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GuangzhouSh, 510275, Guangdong Sheng, China).
(Angew.Chem.;54, 21; 2015, May, 18; 6270-3).

Discusses that the organic mechanoluminochromic materials that are mechano/piazo-responsive and promising for applications in sensors, displays and data storage devices. However, their switching range of emission is seriously impeded by only one kind of emission(either a fluorescent or phosphorescent peak) in the spectrum of single organic compounds. Presents a design strategy for pure organic compounds with excellent room-temperature fluorescent-phosphorescent dual-emission(rFRDE) properties, which combines the effective factors of dipenylsulfone group, crystalline state and heavy atom effect. Myriad emission colors with a wide range from orange to purple and across white zone in a straight line in the chromaticity diagram of the Commission international de l'Eclairage(CIE) can be obtained by simply mechanical grinding the compound through following the principle of color mixing. The unique properties could be concentrated on a pure organic compound through this design strategy, which provides a new efficient channel for the discovery of efficient mechano-responsive organic materials. (30 Ref.; 12 Fig.).

50.15512

Formation of BN isoesters of azo dyes by ring expansion of boroles with azides. BRAUNSCHWEIG (H), CELIK (MA), HUPP (F), KRUMMENACHER (I), MAILANDER (L), (Institut für Anorganische Chemie, Julius-Maximilians-Universität, Sanderring 2, 97070, Würzburg, Germany). (Angew.Chem.; 54, 21; 2015, May, d18; 6347-51).

Presents the results of the authors' investigations on the effect of ortho substitution of aryl azides on the ring-expansion reaction of borodes, five-membered unsaturated boron heterocycles. These studies led to the isolation of the first, 1,2-azaborinine-substituted azo dyes, which are bright-yellow solids. One of the derivatives, (*E*)-2-mesityl-1-(mesityldiazenyl)-3,4,5,6-tetraphenyl-1,2-azaborinine, was found to be unstable in solution and to transform through a Jacobsen-like reaction into an indazole and 1-hydro-1,2-azaborinine. Performed the Dynamic Functional Theory(DFT) calculations to shed light on possible mechanisms to rationalize the unexpected azo-azaborinine formation and to draw conclusions about the role played by the Ortho substituents in the reaction. (50 Ref.; 3 Fig.; 2 Schemes).

50.15513

Direct C(sp²)-C-(sp³) cross-coupling of a diary zinc reagents with benzylic, primary, secondary and tertiary alkyl halides. DUNSFORD (JJ), CLARK (ER), INGLESÓN (MJ), (Tsinghua-Peking Center for Life Sciences, Department of Chemistry, Tsinghua University, No. : 30, Shuangqing Road, HaidanQue, Beijing 100084, Beijing shi, China). (Angew.Chem.; 54, 19; 2015, May, 4; 5713-7).

Describes the successive peptide ligation using an one-pot method that can improve the efficiency of protein chemistry synthesis. Although one-pot three-segment ligation has enjoyed widespread application, a robust method for one-pot four-segment had to date remained developed. Reports here about a new one-pot multisegment peptide ligation method that can be used to condense up to four segments with operational simplicity and high efficiency. Demonstrated its practicality by the one-pot four-segment synthesis of a plant protein, crambin and a human chemokine, hCCL21. (28 Ref.; 15 Fig.; 2 Schemes).

50.15514

Facile hydrolysis and alcoholysis of palladium acetate. BEDFORD (RB), BOWEN (JG), DAVIDSON (RB), HADDOW (MF), SEYAMMOOR-JULEN (AE), SPARKES (HA), WEBSTER (RL), (School of Chemistry, University of Bristol, Cantock's Close, Bristol BS8 1TS). (Angew.Chem.; 54, 22; 2015, May, 26; 6591-4).

Discusses the ready conversion of palladium(II) acetate into [Pd₃/²-OH](OAc)₅ in the presence of water in a range of organic solvents and also its slow conversion in the solid state as well as the complex 1 that can be formed in nominally anhydrous solvents. Similarly, the analogous alkoxide complexes [Pd₃/²-OR](OAc)₅(**3**) are easily formed in solutions of palladium(II) acetate containing a range of alcohols. An examination of a representative Wacker-type oxidation shows that the Pd-OH complex 1 and a related Pd-oxo complex 4 can be excluded as potential catalytic intermediates in the absence of an exogenous water. (24 Ref.; 1 Tab.; 4 Fig.; 3 Schemes).

50.15515

Organocatalytic asymmetric addition of naphthols and electron-rich phenols to Isatin-derived ketimines: Highly enantioselective construction of tetra substituted stereo centers. MONTESINOS-MAGRANER (M), VILLA (C), CANTOR (R), BLAY (G), FERNANDEZ (I), MUNOZ (C), PEDRO (JR),



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(Department de Química Orgánica, Facultat de Química, Universitat de València, Dr. Moliner 50, 46100 Burjassot, Valencia, Spain). (Angew.Chem.; 54, 21; 2015, May, 18; 6320-4).

Describes a quinine-derived thioureaorganocatalyst that promoted the highly enantioselective addition of naphthols and activated phenols to ketimines derived from isatins. The reaction afforded chiral 3-amino-2 oxindoles with a quaternary stereocenter in high yields (up to 99%) with excellent enantioselectivity (up to 99% ee (enantiomeric excess)). This transformation is the first highly enantioselective addition of naphthols to ketimines. (109 Ref.; 1 Tab.; 6 Schemes).

50.15516

Alkyl aryl ether bond formation with phenofluor. SHEN (X), NEUMANN (CN), KLEINLEIN (C), GOLDBERG (NW), RITTER (T), (Department of Chemistry and Chemical Biology, Harvard University, No. : 12 Oxford Street, Cambridge, Massachusetts 02138, USA). (Angew.Chem.; 54, 19; 2015, May, 4; 5662-5).

Describes an alkyl aryl ether bond formation reaction that has been developed between phenols and primary and secondary alcohols with Phenofluor. The reaction features a broad substrate scope and tolerates many functional groups and substrates that are challenging for more conventional ether bond forming processes may be coupled. A preliminary mechanistic study indicates reactivity distinct from conventional ether bond formation. (35 Ref.; 1 Tab.; 4 Schemes).

50.15517

Performance of flyash and copper slag based geopolymer concrete. MAHENDRAN (K), ARUNACHALAM (N), (Rural Technology Center, Gandhigram Rural Institute, Deemed University, Gandhigram, Dindigul-624 302, Tamil Nadu State, India). (Indian J. Sci. Technol.; 9, 2; 2016, Jan.; 1-6).

Investigates the possibilities of using copper slag as a fine aggregate in geopolymer concrete in ambient curing and examines the hot air oven curing condition. Studies the strength development in the concrete with different percentage of copper slag added as a partial replacement of the fine aggregate in the mix. (22 Ref.; 6 Tab.; 7 Fig.).

50.15518

Beyond acid strength in zeolites : Soft framework counteranions for stabilization of carbocations on zeolites and its implication in organic synthesis. CABRERO-ANTONINO (JR), LEYVA-PEREZ (A), CORMA (A), (Instituto de Tecnología Química, Universidad Politécnica de Valencia-Consejo Superior de Investigaciones Científicas, Avda. De los Naranjos s/n, 46022, Valencia, Spain). (Angew.Chem.; 54, 19; 2015, May, 4; 5658-61).

Describes the generation of a carbocation with an acid depends not only on the acid strength but also on the ability of the counteranion to stabilize the positive charge left behind. Reports here that despite their relatively weak acidity, zeolites are able to generate and stabilize medium-size (molecular weight=300 Da) delocalized carbocations on their surface under mild reaction conditions, as it can be done by strong Brønsted or Lewis acids in solution. The zeolites thus acts as a soft macroanion, prolonging the lifetime of the carbocation sufficiently to perform multifunctionalization reactions with amides, thioamides and phenols, with high yield and selectivity. Biological studies show that some of the products obtained here present significant inhibition activity against colon cancer cells, illustrating the new possibilities of zeolites to prepare complex organic molecules. (50 Ref.; 4 Tab.; 1 Fig.).

BY-PRODUCTS

50.15519

Extraction of resin from cashew nut sludge an agro-industrial wastes. SIVAMANI (S), PRIYA (PG), (Heterogeneous catalysis, zeolite, fly ash, material characterization Division, National Institute of Technology (NIT), Sector-2, Rourkela-769 008, Odisha State, India). (J. Sci. Ind. Res.; 74, 8; 2015, Aug.; 476-8).

Describes the extraction of resin from the cashew nut sludge (agro-industrial waste) that was done using three different solvents namely methanol, propanol and diethyl ether and the propanol, among the three solvents that shows better results for extraction of resin as well as the further confirmation with fourier transform infrared (FTIR), thermogravimetric analysis (TGA) and dynamic scanning calorimetry (DSC). The FT-IR spectroscopic analysis was used to structural changes during the extracted resin



using propanol. The maximum peak obtained propanol as a solvent for the extraction of resin was 14-16 minutes intensity. All the experimental study throughout the present study indicated that the obtained resin has wide application on waste water treatment. It can be used as a cheap substitute instead of commercial resin for a better environment. (10 Ref.; 5 Fig.).

50.15520

Photooxidizing chromium catalysts for promoting radical cation cycloadditions. STEVENSON (SM), SHORES (MP), FERREIRA (EM), (Department of Chemistry, Colorado State University, Fort Collins, Colorado 80523, USA). (Angew.Chem.; 54, 22; 2015, May, 26; 6506-10).

Describes the photooxidizing capabilities of selected Cr^{III} (chromium III) complexes for promoting radical cation cycloadditions. These complexes have sufficiently long-lived excited states to oxidize electron-rich alkenes, thereby initiating [4+2] processes. These metal species augment the spectrum of catalysts explored in photoredox systems, as they feature unique properties that can result in differential reactivity from the more commonly employed ruthenium or iridium catalysts. (53 Ref.; 1 Tab.; 3 Fig.; 3 Schemes).

50.15521

Amphiphilic tobramycins with immunomodulatory properties. GUCHHAIT (G), ALTIERI (A), GORITYALA (B), YANG (X), FINDLAY (B), ZHANEL (GG), MOOKERJEE (N), SCHWEITZER (F), (Department of Chemistry, University of Manitoba, Winnipeg, No. : 66 Chancellors Circle, MB, R3T 2N2, Canada). (Angew.Chem.; 54, 21; 2015, May, 15; 6278-82).

Describes amphiphilic aminoglycosides(AAGs) as an emerging source of antibacterials to combat infections caused by antibiotic-resistant bacteria. Mode-of-action studies indicate that AAGs predominantly target bacterial membranes, thereby leading to depolymerization and increased permeability. The AAG-dependent induction of cytokines in macrophages in the absence or presence of lipopolysaccharides(LPS) had been determined for accessing whether AAGs also induce host-directed immunomodulatory responses. The results had shown for the first time that AAGs can boost the innate immune response, specifically the recruitment of immune cells such as neutrophils required for the resolution of infections. Moreover, AAGs can selectively control inflammatory responses induced in the presence

of endotoxins to prevent septic shock. In conclusion, this study demonstrates that AAGs possess multifunctional properties that combine direct antibacterial activity with host-directed clearance effects reminiscent of those of host-defense peptides. (42 Ref.; 8 Fig.; 1 Scheme).

50.15522

Recovery and utilization of wash water solids generated during ilmenite leaching operation. GEORGE (J), NAIR (VV), NINAN (G), NAIR (K), (R&D Department, The Kerala Minerals and Metals Limited, Sankaramangalam – 691 583, Cleavara, Kollam, Kerala State, India). (J. Sci. Ind. Res.; 74, 6; 2015, Jun.; 362-6).

Discusses that the solid content in the spent wash water generated during leaching operation in chloride process for the production of TiO₂ (titanium oxide) pigment is not recovered and considered waste. Proposes a method to recover the solids and enrich the titanium values in these solids. Determines the composition of the recovered and enriched solids by atomic absorption spectroscopy and other analytical techniques. The samples are characterized using X-ray diffraction (XRD) and scanning electron microscopy (SEM). Studies the pigmentary qualities of the recovered material in enamel paint formulations and compared against commercial rutile TiO₂ pigment. Partial replacement of the TiO₂ pigment with the recovered material has not made any significant impact on the various characteristics studied and approached the commercial rutile TiO₂ pigment standards. Also partial replacement realizes a TiO₂ saving in enamel paint formulations. (21 Ref.; 1 Tab.; 3 Fig.).

TANNERY. ENVIRONMENTAL ASPECTS

50.15523

Cleaner processing of bovine wet-white : Synthesis and application of a novel chrome-free tanning agent based on an amphoteric organic compound. LUO (J), FENG (Y), (College of Material and Textile Engineering, Jiaying University, No. : 453 Yuexiu South Road, Nanhu Qu Shi, Zhejiang Sheng, Jiaying 314000, People's Republic of China). (J. Soc. Leather Technol. Chem.; 99, 4; 2015, Jul.-Aug.; 190-6).

Describes the wet-white processing as an effective method to reduce or get rid of chrome pollution. However, the current chrome-free tanning agents can't meet the needs both of the market and of environmental protection regarding the aspects of shrinkage temperature, the state of wet-white tanned and clean



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production. A novel chrome-free tanning was synthesized through radical polymerization by employing acrolein and diallyl dimethyl ammonium chloride. Studied the application of the cleaner processing of bovine wet-white leather based on this novel chrome-free agent. The results show that the novel chrome-free agent has the structure of an amphoteric organic compound, appropriate molecular weight and exhibits good tanning properties. The optimal tanning conditions are such as : the pH value of pickled hide is adjusted to 6.0-7.0, the consumption of the novel chrome-free agent is 5% based on 150% times the weight of pickle and the pH is directly tanned for 5 hours at room temperature, then the pH value of the float is adjusted to 7.0-8.0, 100% hot water is added to raise the temperature to 35°C Centigrade-40°C Centigrade and the leather is tanned for a further 5 hours. The shrinkage temperature of the leather tanned by the novel chrome-free agent can achieve 86°C Centigrade and so and the leather has fine grain and good feel. The bated pelt could be tanned directly by adjusting the balance of the formulation, on the basis of the performance of the novel chrome-free tanning agent and its tannage, which will greatly reduce the content of chloride ion in the effluent so as to contribute to the clean production of leather. (12 Ref.; 4 Tab.; 9 Fig.).

LEATHER PRODUCTS

FOOTWEAR

50.15524

Stagnant exports-The way ahead. SAHASRANAMAN (A), (ILIFO(Indian Leather Industry Foundation), No. : F2, "Shreyas", No. : 87, Greenways Lane, Greenways Road, Raja Annamalai Puram, Chennai – 600 028, India). (Leather News India; 7, 1; 2016, Jan.; 76-8).

Describes that the ratio of the exports of leather products from India which has been shown by the leather sector in the decline level since the financial year 2015 which

was remaining in the raising levels before that year. Stresses very strongly about the need to think in the different way for eradicating the decline in the Indian exports. It is shown earlier that the industry's growth in export market has been mainly dependent on the designs and the markets provided by imports of the Indian products. The industry is quite aware of the fact that what it does in most of the factories is a mere conversion job, all inputs being provided by the buyer. Indicated that the two challenges namely designs and branding with gusto have to overcome and make concerted efforts over the coming few years so that in future the world will start buying Indian designed and products.

50.15525

Domestic growth beyond dispute in China and India. (World Footwear; 30, 2; 2016, Mar.-Apr.; 12-4).

States that the news of the disappointing growth of the Chinese economy of only 6.9% in the last year has occupied the predominant place and served as the big news in the financial markets. It has been the lower growth than in the recent years, but higher than in most other markets. It is noted that India has been the only exception, where growth rates are almost 7. % which is found as the good news for the footwear industry in both countries.(4 Photos).

50.15526

More than one choice.(World Footwear; 30, 2; 2016, Mar.-Apr.; 24-5).

Discusses the dismal fact that large numbers of mega projects that had been planned for operations had been unexpectedly shelved and completely ruined the oil industry which have made the disastrous effects on both the leather and footwear industries. Questioned the future of the footwear industry as it had been decided to shelve those mega oil projects. (2 Photos).



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Owner: Indian Leather Technologists' Association, **Printer:** Mr. S. D. Set, **Publisher:** Mr. S. D. Set,
Published From: 'Sanjoy Bhavan', (3rd floor), 44, Shanti Pally, Kasba, Kolkata - 700107, West Bengal,
India **AND Printed From:** M/s TAS Associate, 11, Priya Nath Dey Lane, Kolkata- 700036, West
Bengal, India, **Editor:** Dr. Goutam Mukherjee.