VATIS UPDATE

Ozone Layer Protection

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Apprise yourself with the latest technological innovations

Highlights

- Microbes fighting harmful greenhouse gas
- Automated refrigerant reclamation process
- Aqueous aerosol cleaner/degreaser
- Alternative pharmaceutical propellant
- Lightweight microcellular polyimide foams
- High-voltage heat treatment of export logs

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Asian and Pacific Centre for Transfer of Technology (APCTT)

Ozone Cell
Ministry of Environment and Forests
Government of India

The **Asian and Pacific Centre for Transfer of Technology (APCTT)**, a subsidiary body of ESCAP, was established on 16 July 1977 with the objectives: to assist the members and associate members of ESCAP through strengthening their capabilities to develop and manage national innovation systems; develop, transfer, adapt and apply technology; improve the terms of transfer of technology; and identify and promote the development and transfer of technologies relevant to the region.

The Centre will achieve the above objectives by undertaking such functions as:

- Research and analysis of trends, conditions and opportunities;
- Advisory services;
- Dissemination of information and good practices;
- Networking and partnership with international organizations and key stakeholders; and
- Training of national personnel, particularly national scientists and policy analysts.

The shaded areas of the map indicate ESCAP members and associate members

Cover Photo

Scientists at the South Pole releasing a balloon that will carry an ozone instrument 32 km up in the atmosphere, measuring ozone levels all along the way

(Credit: NOAA, the United States)

VATIS* Update
Ozone Layer Protection
is published 6 times a year to keep the readers up to date of most of the relevant and latest technological developments and events in the field of Ozone Layer Protection. The Update is tailored to policy-makers, industries and technology transfer intermediaries.

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Antarctic ozone hole second smallest in two decades

Warmer air temperatures high above the Antarctic led to the second smallest seasonal ozone hole in 20 years, satellite measurements taken by the United States National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics & Space Administration (NASA) reveal. This year, the average size of the ozone hole was 17.9 million square kilometres. The Antarctic ozone hole forms in September and October, and this year, the hole reached its maximum size for the season on 22 September, stretching to 21.2 million square kilometres, roughly the area of the United States, Canada and Mexico combined. In comparison, the largest ozone hole recorded to date was in 2000 at 29.9 million square kilometres.

"It happened to be a bit warmer this year high in the atmosphere above Antarctica, and that meant we didn't see quite as much ozone depletion as we saw last year, when it was colder," said Mr. Jim Butler with NOAA's Earth System Research Laboratory. NOAA and NASA scientists keep a close eye on the ozone layer's health with satellite data, ground-based measurements and balloon-borne instruments. The Ozone Mapping Profiler Suite (OMPS), a new ozone monitoring instrument on Suomi-NPP weather satellite, will be key to that effort. "This OMPS instrument allows us to more closely see the vertical development of Antarctic ozone depletion in the lower stratosphere where the ozone hole occurs," says Mr. Pawan Bhartia, an atmospheric physicist at NASA and OMPS instrument lead.

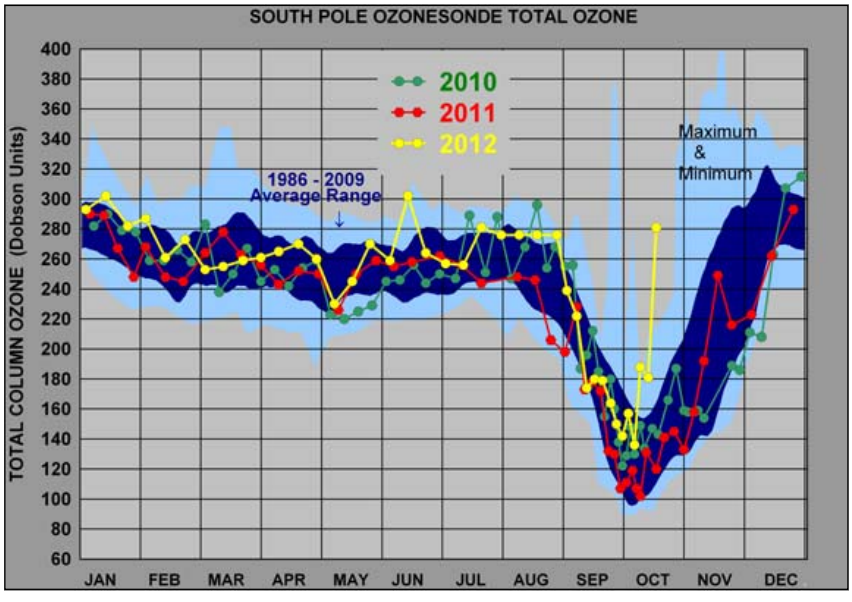
Source: www.noaanews.noaa.gov

Increased ozone loss from injected water vapour

A team of researchers led by Dr. James G. Anderson at the School of Engineering and Applied Sciences, Harvard University, the United States, has said that the observed presence of water vapour convectively injected deep into the stratosphere over the United States can fundamentally change the catalytic chlorine/bromine free-radical chemistry of the lower stratosphere by shifting total available inorganic chlorine into the catalytically active free-radical form of chlorine oxide. This chemical shift markedly affects total ozone loss rates and makes the catalytic system extraordinarily sensitive to convective injection into the mid-latitude lower stratosphere in summer.

There is conclusive evidence that strong warm-weather storms could send water vapour to a height of more than 19 km, while chlorine activation depends exponentially on water vapour and temperature. The team postulates that, were the intensity and frequency of convective injection to increase because of climate forcing by the continued addition of carbon dioxide and methane to the atmosphere, increased risk of ozone loss and associated increases in ultraviolet (UV) dosage would follow. *Contact: Dr. James G. Anderson, Department of Earth & Planetary Sciences and School of Engineering & Applied Sciences, Harvard University, Cambridge, MA 02138, United States of America. E-mail: anderson@huarp.harvard.edu.*

Source: www.sciencemag.org



Ozone levels at the South Pole dropped less in this spring, as the line in yellow indicates

Antarctic ozone hole smaller than in 2011

The hole in the ozone layer is expected to be smaller in 2012 over the Antarctic than last year, showing how a ban on harmful substances has helped stop its depletion, the World Meteorological Organization (WMO) said in a statement. "The temperature conditions and the extent of polar stratospheric clouds so far this year indicate that the degree of ozone loss will be smaller

than in 2011 but probably somewhat larger than in 2010," it said.

The Antarctic ozone hole, which currently measures around 19 million square kilometres, most likely would be smaller this year than in the record year of 2006, WMO said. The annual occurrence typically reaches its maximum surface area during late September and maximum depth in early October. However, the banned chlorofluorocarbons (CFCs) have a long lifetime in the atmosphere, and it will take several decades before their concentrations are back to pre-1980 levels, WMO said.

The Montreal protocol has been a "great success", WMO expert Mr. Geir Braathen claimed. "This has prevented a major environmental disaster and globally ozone depletion has levelled off. We haven't really seen any kind of unequivocal ozone recovery yet," he said. In the Arctic stratosphere, there was record ozone loss in spring of 2011, but it has returned to more normal conditions this year, Mr. Braathen said.

Source: www.reuters.com

Microbes fighting harmful greenhouse gas

The environment has a more perilous opponent than carbon dioxide. Another greenhouse gas, nitrous oxide (N_2O), is 300 times more potent and also destroys the ozone layer each time it is released into the atmosphere through agricultural practices, sewage treatment and fossil fuel combustion. Fortunately, nature has a larger army than previously thought fighting this greenhouse gas – according to a study led by Mr. Frank Loeffler from University of Tennessee, Knoxville, the United States.

Scientists have long known about naturally occurring microorganisms called denitrifiers, which fight N_2O by transforming it into harmless nitrogen gas. Mr. Loeffler – also the Oak Ridge National Laboratory Governor's Chair for Microbiology, the United States – and his team have now found out that this ability also exists in many other groups of microorganisms, all of which consume N_2O and potentially mitigate emissions. They screened available microbial genomes encoding the enzyme systems that catalyse the reduction of the N_2O to nitrogen.

The scientists discovered an unexpected broad distribution of this class of enzymes across different groups of microbes with the power to transform N_2O to nitrogen gas. Within these groups, the enzymes were related yet evolutionarily distinct from those of the well known denitrifiers. Microbes with this capability can be found in most, if not all, soils and sediments, indicating that a much larger army of micro-organisms contributes to N_2O consumption.

Source: www.sciencedaily.com

Ozone depletion in Antarctica affecting climate

New research has found that ozone depletion in Antarctica affects climate conditions across the Southern Hemisphere, which in turn control tree growth in Tasmania (Australia), New Zealand and Patagonia (Argentina and Chile). Mr. Andrés Holz, Research Associate, University of Tasmania (UTAS) School of Plant Science, was part of the research team that used tree-ring records from more than 3,000 trees in South America, Tasmania and New Zealand to identify dominant patterns of tree growth in recent centuries. The research was led by Mr. Ricardo Villalba from the National Council for Scientific and Technical Research (CONICET), Argentina.

Recent changes in the summer climate Southern Hemisphere extratropics are primarily related to the dominance of the positive phase of the Southern Annular Mode (SAM). SAM describes see-saw-like differences in atmospheric pressure between high and mid latitudes, which affect the strength and latitude of the westerly winds. SAM's 'positive phase' describes a decrease in atmospheric pressure at high latitudes and an increase in pressure at mid latitudes, which results in dry and warm conditions in Patagonia, western Tasmania and New Zealand.

Mr. Holz said that since the late 1970s, the stratospheric ozone depletion has caused more frequent positive phases in SAM. The research showed that the foremost patterns of growth between 1950 and 2000 differed significantly (and asymmetrically among regions) from those in the earlier 250 years. "Specifically, we found that tree growth was higher than the long-term average in the sub-Alpine forests of Tasmania and New Zealand, but lower in the dry-Mesic forests of Patagonia." Mr. Holz said the research demonstrates that variations in SAM can explain 12-48 per cent of the tree growth anomalies in the latter half of the 20th century. The worry is that even with future ozone recovery, SAM is expected to remain in its positive phase for the next 100 years or so owing to increased global temperature. This might result in long-term ecological consequences, including drought-induced death of trees in Patagonia and increased bushfires in Tasmania and New Zealand.

Source: www.media.utas.edu.au

25th anniversary of the Montreal Protocol celebrated

This year being the 25th anniversary of the Montreal Protocol, the Ozone Cell of the Ministry of Environment and Forests (MoEF) celebrated the International Ozone Day on 13 September with the theme "Protecting our atmosphere for generations to come", emphasizing the extraordinary collaboration and environmental benefits achieved by the world's governments through the operation of the Montreal Protocol. On the occasion of the 25th anniversary of the Montreal Protocol and the 18th International Day for the Preservation of the Ozone Layer, the Ozone Cell organized the following activities:

- Exhibition of non-ODS technologies developed and marketed by various industries;
- Publication of "The Montreal Protocol: India's Success Story", a booklet highlighting the initiatives and achievements of the Ozone Cell on the implementation of the Montreal Protocol in India;
- Publication of a poster, pledge and a sticker for distribution to the industry, institutions, government departments, schools, students and others in order to create public awareness;
- Telecasting of a video film on the Montreal Protocol and Ozone Layer through Doordarshan; and
- Painting, poster, slogan writing, model making, skit and quiz competitions for school children.

The winners of the competitions in various categories were presented cash awards, mementoes as well as merit certificates at the function organized on the occasion of the 25th anniversary of the Montreal Protocol and the 18th International Day for the Preservation of the Ozone Layer. School children and other stakeholders who participated in the function received school bags and caps with logo of the Ozone Cell and the 25th anniversary of the Montreal Protocol.

Source: www.ozonecell.com

Reduction of CFC emissions

In observation of the 18th International Ozone Day, the West Bengal Pollution Control Board (WBPCB) held a conference on 16 September 2012 for environmental scientists and industry representatives to discuss strategies for reducing the emission of chlorofluorocarbons (CFCs) into the environment.

Representing the Confederation of Indian Industry (CII), Mr. Anil Vaswami, Member of CII West Bengal State Council, said that one key factor in reducing emissions is generating awareness among small and medium industries. "People know about the greenhouse effect, but they might not consider the role of individual industries in producing greenhouse gases," Mr. Vaswami said. The CII is holding workshops to give industries confidence that they can benefit from reducing emissions, he revealed.

India's next target as a developing country is to eliminate the use of methyl chloroform and methyl bromide by 2015, observed Mr. Navin Lamba from Crystal Refrigeration Company, who represented the Federation of Small and Medium Industries (FOSNI). Methyl chloroform is used as a solvent, as well as in consumer products like glues, household cleaners and aerosol sprays, while methyl bromide is used as a pesticide.

Mr. S.K. Sadhu, Vice President of Ambuja Cement, supported the demand for a universal mandate for countries to reduce their greenhouse gas emissions by five per cent. Commenting on the cement industry's role in this, Mr. Sadhu said, "The cement industry is contributing around five per cent of greenhouse gas emissions globally. In developing countries, there is increased demand for cement so this figure can only rise."

Source: thestatesman.net

Pioneer in natural refrigerant compressor

Emerson Climate Technologies (India) Limited has reinforced its position as a leader in the Heating, Ventilation, Air-conditioning and Refrigeration (HVACR) segment by being the first one to develop indigenously a compressor that runs on the environment-friendly R290 refrigerant. R290 is a natural hydrocarbon refrigerant having zero Ozone Depletion Potential (ODP) and a low Global Warming Potential (GWP), as set by the Kyoto Protocol. In commercial refrigeration applications, these new R290 compressors are more efficient than other chemical refrigerants. The company has already developed three models of R290 compressors and will be supporting the environmental initiatives by some of the largest beverage manufacturers in India.

Emerson's plant in Atit, Maharashtra, has achieved another major milestone by building one million compressors within a period of one year – an achievement unprecedented in the industry. The company manufactures compressors in India and exports them to countries across Europe, Middle East, Latin America and Asia.

Source: www.emerson.com

Ozone layer on track to recover in five decades

Secretary-General of the United Nations, Mr. Ban Ki-Moon, hailed the efforts of the international community in protecting the atmosphere, noting that with the global phase-out of 98 per cent of ozone-depleting gases, the ozone layer is now on track to recover over the next five decades. "I urge governments and all partners to apply the same spirit to the other great environment and development challenges of our times. Together, we can achieve the future we want," Mr. Ban said in his message on 16 September 2012, the 18th International Day for the Preservation of the Ozone Layer.

This year marks the 25th anniversary of the Montreal Protocol, and Mr. Ban congratulated all who have made the treaty such an "outstanding example" of international cooperation. The Protocol, he noted, has helped avoid millions of cases of skin cancer and eye cataracts, as well as the harmful effects of ultraviolet radiation on the environment. It has also catalysed considerable innovation in the chemical and equipment manufacturing industry, resulting in more energy-efficient and environment-friendly refrigeration systems. Mr. Ban said action under the Protocol has also had significant climate benefits.

"Nonetheless, the challenges are not over," cautioned Mr. Ban. He called on governments to maintain their commitment to finish the job and avert additional problems. The use of hydrofluorocarbons – ozone-friendly chemicals that are also powerful greenhouse gases – is growing rapidly to replace ozone-depleting substances, he noted. "The Montreal Protocol has demonstrated that fundamental principles – such as science-based policy making, the precautionary approach, common but differentiated responsibilities and equity within and between generations – can benefit all nations," Mr. Ban said.

Source: www.un.org

Draft ISO standard slashes HC charge limits

A draft safety standard from the International Organization for Standardization (ISO), in circulation at present and due to be voted on shortly, would restrict the maximum allowable charge of inflammable hydrocarbon refrigerants in several applications and tighten ammonia limits, while exempting some newly developed inflammable chemical refrigerants from similar provisions. This could have a worldwide impact on limiting the use of low-GWP natural refrigerants, especially as several nations look to international standards to advise their transition away from hydrochlorofluorocarbons (HCFCs).

The proposed standard represents a step backwards with regards to adopting safety standards that reflect technological progress in safety aspects of natural refrigerant technology. While the natural refrigerant industry has long been calling for a revision of already restrictive standards that limit maximum allowable charges, the ISO standard proposed would further aggravate the situation as:

- The maximum amount of hydrocarbons allowed in refrigeration systems that are wholly or partly located in a human occupied space is reduced to 1 kg (1.5 kg and 2.5 kg for general and supervised occupancies, respectively, in EN 378 European safety standard);
- The maximum amount of hydrocarbons that can be used for chillers for air-conditioning and certain refrigeration systems is 1 kg (unlimited charge in EN 378);
- The amount of ammonia that can be used in certain occupied spaces (working areas, etc.) has been almost halved (as compared to EN 378);
- When using certain inflammable refrigerant such as R1234yf or R32, new measures offered enable considerably larger charge quantities, provided some simple steps are adopted (such as stop-valves and/or ventilation), whereas these options are not available for natural refrigerants such as ammonia or hydrocarbons; and
- The proposed standard encourages the very risky practice of not using safe electricals with the A2L inflammable refrigerants.

Source: www.hydrocarbons21.com

New reports on refrigerants released

Two recent reports provide detailed studies of refrigerants, evaluating how newer refrigerants – ranging from hydrofluorocarbon (HFC) and hydrofluoroolefin (HFO) F-gases to natural refrigerants such as ammonia (NH_3), carbon dioxide (CO_2) and hydrocarbons (HCs) – stack up against the current crop of popular refrigerants. While one report focuses on refrigerants with low global warming potential (GWP), the other concentrates on the cost effectiveness of refrigerants. The Air-Conditioning, Heating and Refrigeration Institute (AHRI), based in the United States, is in the midst of a Low GWP Alternative Refrigerants Evaluation Programme (Low-GWP AREP). The approved test reports are due only in early 2013, some preliminary results have been revealed. Emerson Climate Tech-

nologies, India, reviews the cost-effectiveness of refrigerants in its report entitled "Lifecycle Climate Performance (LCCP) of Various Refrigerants and System Options".

The ongoing Low-GWP AREP is testing 38 potentially low-GWP refrigerants that could be used as alternatives instead of higher GWP refrigerants. "These refrigerants represent what the industry currently feels have great potential to replace HCFC-22, R-134a, R-404A and R-410A," declared AHRI's Mr. Xudong Wang, who presented a paper on the subject. Noting the phase-out of R-22 by 2040 in developing countries and 2030 in developed countries, Mr. Wang said HFCs such as R-410A and R-134a "have come under close scrutiny due to global warming concerns". Five familiar and commonly used refrigerants – R-134a, R-404A, R-410A, R-22 and HFC-407C – were set as baseline refrigerants and newer refrigerants – such as R-32, ammonia, propane and HFO-1234yf – compared with each of them.

The issue of efficiency was one reason that prompted the LCCP project, says Mr. Rajan Rajendran, Vice President of Engineering Services and Sustainability for Emerson Climate Technologies. "New synthetic lower GWP refrigerants and natural candidates are options for air-conditioning, heat pump and refrigeration applications," he said. LCCP approach to system design and refrigerant choice adopts a holistic approach to refrigerant selection factoring in safety, environment, performance and total costs. The LCCP study looked at three categories of current applications: unitary air-conditioner, commercial air-conditioner, small chillers; refrigeration; and large chillers and mobile refrigeration. It then looked at new low-GWP refrigerants for OEM use (such as the HFOs) and developmental refrigerants that would be used in new rather than retrofit applications. In addition, developmental synthetic refrigerants for existing applications were examined, besides what the study referred to as "today's refrigerants," such as those in the R-400 series (including 404A, 407A, 407C, 407F and 410A).

Mr. Rajendran noted that many lower GWP synthetic candidates, which target keeping performance the same and reducing GWP and LCCP, would soon become commercially available. Natural refrigerants like propane, NH_3 and CO_2 should be considered when they make sense, he noted. "Regulations, safety, economics and performance have to favour choice over all alternatives," he opined. The study found that there are alternatives to R-404A, including R-407A and R-407F that give "good performance overall with lower GWP and lower LCCP". The traditional air-conditioning refrigerant R-410A is a "good option in medium temperature (refrigeration) and acceptable in low temperature applications with system redesign," he noted.

Source: www.achrnews.com

Sri Lanka to phase-out HCFC production

The Government of Sri Lanka is set to initiate regulatory measures to control the import, export and production of the hydrochlorofluorocarbons (HCFCs) from 1 January 2013, in step with the mandate under the Montreal Protocol to phase out HCFCs completely by 2030. The Sri Lankan Cabinet has approved a proposal made by the Minister of Environment, Mr. Anura Priyadarshana Yapa, in this regard, and has taken decision to direct the Controller of Imports and Exports, the regulatory body, to introduce appropriate regulations for the purpose under the provisions of the relevant Act.

Source: www.news.lk

China evaluates the real risks of hydrocarbon

China intends to switch half its production of split air-conditioners to propane (R290) in order to meet the objectives of its Hydrochlorofluorocarbon (HCFC) Phase-out Management Plan by 2015. The decision was taken following a comparison of the actual risk factors with the accepted public risk levels, a process known as quantitative risk assessment (QRA).

QRA involved identifying potential leakage points and using computational fluid dynamics (CFD) to study the gas flow within a room and its tendency to concentrate near points of ignition such as electrical switches. The successive chain of probabilities that could lead to an explosion were as follows: a gas leak entering the room, no diluting air currents, build-up to a inflammable concentration (2-10 per cent in the air) and a close source of active ignition. The results showed that the real risk from R290 ignition events was 0.005 per million per year, far below the "acceptable risk level" of 100 per million per year.

Source: www.hydrocarbons21.com

Pakistan to check import of ODS

Pakistan Customs has directed its officials to prevent import of products that cause rapid depletion of the ozone layer. The customs authority circulated a fresh list of the most common ozone depleting

substances (ODS) under revised Harmonised System (HS) codes. It also informed the officials about non-ozone depleting substances, most popular refrigerants trade names and danger symbols. The list also gave information on the countries that are producing the restricted ODS.

Pakistan Customs is taking some initiatives under "Green Customs" jointly launched by the World Customs Organization and the United Nations Environment Programme (UNEP) with the global project called "Sky-Hole Patching II", which resulted in the seizure of large quantities of smuggled ODS. More than 7,500 cylinders of chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and other ODS were confiscated, according to an alert from Pakistan's Federal Board of Revenue (FBR).

Source: www.thenews.com.pk

Philippines to gradually phase out HCFCs

The Department of Environment and Natural Resources (DENR) of the Philippines will start phasing out the importation and use of hydrochlorofluorocarbons (HCFCs) in foam sprays, solvents, fire extinguishers, and industrial and residential air-conditioning units starting January 2013. Mr. Ramon J.P. Paje, Secretary of Environment and Natural Resources, announced this during the celebration of the 25th Anniversary of the Montreal Protocol on Substances that Deplete the Ozone Layer.

Mr. Paje explained that the gradual phase-out would begin with the country freezing the importation of HCFCs at the 2010 base level of 162 ozone depleting potential (ODP) tonnes. The level would then be reduced by 10 per cent starting 2015, 35 per cent in 2020, 67.5 per cent in 2025, 97.5 per cent in 2030, and total ban in 2040. The Philippines has successfully completed the phase-out of: three types of chlorofluorocarbons (CFCs) used in foams, aerosols and refrigerants; halons, fire-extinguishing agents; carbon tetrachloride, a dry cleaning agent; methyl chloroform, used in manufacturing metal and plastic products; and methyl bromide, used in agricultural pesticides and fumigation of products for export.

Mr. Paje said that DENR has submitted the draft HCFC Phase-out Management Plan (HPMP) to the Executive Committee of the Multilateral Fund for its consideration and approval during its meeting in December 2012. The HPMP lays down the implementation of investment and non-investment projects in phasing out HCFCs. Investment projects would provide technical and financial assistance to priority sectors as they shift to HCFC alternatives. Non-investment projects, on the other hand, include training and capacity building among the involved sectors and institutions, technical assistance, and information and education campaigns.

Source: www.gov.ph

Republic of Korea to accelerate HCFC phase-out

The Republic of Korea is planning to phase out emissions of hydrochlorofluorocarbons (HCFCs) by 2030, 10 years faster than agreed to under the Montreal Protocol on the reduction of ozone-depleting substances. The government will start in 2013 to impose ceilings on the production and consumption of HCFCs, the Ministry of Knowledge Economy states. While the country was asked to phase HCFCs out by 2040, the government will scale down the quantities that companies are allowed to use or import to zero by 2030, according to the statement. The more than 190 states that ratified the Montreal Protocol on ozone-depleting substances agreed in 2007 to a total phase-out of the gases by 2030 in developed countries and by 2040 in poorer nations.

Source: www.businessweek.com

Viet Nam needs US$20 million to eliminate HCFCs

Viet Nam needs US$20 million to completely phase out the ozone-depleting hydrochlorofluorocarbons (HCFCs) within the next 15-20 years, said Mr. Nguyen Khac Hieu, Deputy Chief of the Hydro-Meteorological and Climate Change Department. In its efforts to protect the ozone layer after signing the Montreal Protocol on Substances that Deplete the Ozone Layer in 1994, Viet Nam has removed 97 per cent of ozone depleting substances from production and use.

Since 1 January 2010, Viet Nam has phased out 500 tonnes of chlorofluorocarbons (CFCs), used often in air-conditioners and refrigerators, and 3.8 tonnes of halons, usually used for fire protection. The country has also ceased the use of carbon tetrachloride, a major component in textile production. However, Vietnamese businesses are still using HCFCs in producing air-conditioners and refrigerators, because the recommended alternatives are too expensive. Further, it takes manufacturing businesses 10-15 years to change over to new technologies. Viet Nam's use of HCFCs is expected to reach 3,700 tonnes in 2012.

Source: talkvietnam.com

New R-410A heat pump for pool heating

Electroheat PRO 96kW heat pump

Waterco Ltd., a leading swimming pool and spa equipment supplier based in Australia, has introduced the Electroheat PRO 96kW heat pump for pool heating. Electroheat PRO 96 is a new generation, commercial-grade heat pump that uses environment-friendly R410A refrigerant. It is designed to heat pools up to 250,000 litres in capacity with a maximum flow rate of 680 litres per minute and coefficient of performance (COP) of 6.2. PRO 96's dual high-performance hermetic scroll compressors run at increased efficiency, with less noise and vibration compared with products using other refrigerant types.

Key features of Electroheat PRO 96 heat pumps include:

- Electronically controlled temperature management;
- Continuous digital temperature display;
- Fault diagnostic system;
- Auto defrost control, flow switch, refrigerant pressure monitoring and compressor protection timer;
- Two 11 hp Sanyo hermetic scroll compressors (415 V/50 Hz/three-phase); and
- Six titanium heat exchangers and twin evaporators.

Source: www.infolink.com.au

Identifying refrigerant fluids with low GWP

Researchers at the National Institute of Standards and Technology (NIST), the United States, have developed a new computational method for identifying candidate refrigerant fluids with low global warming potential (GWP), as well as other desirable performance and safety features. The NIST effort is one of the most extensive systematic search for a new class of refrigerants that meet the latest concerns about climate change. The new method was used to identify around 1,200 promising, low-GWP chemicals for further study from among some 56,000 that were considered. Only about 60 of these have boiling points low enough to be suitable for common refrigeration equipment, an indication of how difficult it is to identify usable fluids.

The refrigerants now used in cars and homes are mainly hydrofluorocarbons (HFCs), some of which are now being phased out because of their high GWP. For instance, R-134a, an HFC refrigerant used commonly in automobile air-conditioners and home refrigerators, has a GWP of 1,430 – much higher than the GWP of 150 or less now mandated for automotive use in Europe. Low-GWP chemicals that hold promise include fluorinated olefins, which react rapidly with atmospheric compounds and thus will not persist for long periods.

The new NIST method estimates GWP by combining calculations of a compound's radiative efficiency (a measure of how well it absorbs infrared radiation) and atmospheric life-time, both derived from molecular structure. Additional filtering is based on low inflammability and toxicity, adequate stability, and critical temperature (where the compound's liquid and gas properties converge) in a desirable range. The method was applied to 56,203 compounds and identified 1,234 candidates for further study. The method, which was validated against available literature data, is accurate and fast enough for virtual screening applications. The approach is similar to the large-scale virtual screening and computational design methods for discovering new pharmaceuticals.

Source: phys.org

Air-conditioner using refrigerant HFC32

To mitigate the environmental impact from refrigerants, the Japanese company Daikin Industries Ltd. will adopt in its air-conditioners (ACs) the hydrofluorocarbon refrigerant HFC32, which has just about one-third the global warming potential (GWP) of the conventional refrigerant R410A. Starting with all models of residential ACs launched in the country from fall 2012, Daikin aims to extend the use of HFC32 to all commercial air-conditioning equipment in the future.

In addition to having a lower GWP than that of R410A, the comparatively better energy efficiency of HFC32 could help curtail greenhouse gas (GHG) emissions from energy sources when equipment is in use. Furthermore, it is also a refrigerant that reduces the amount of refrigerant needed per AC unit, has the advantage of enabling components (heat exchangers, for example) to be made compact, and is suitable for refrigerant recycling.

Following an investigation that took a comprehensive look at the next-generation candidates such as natural and HFC refrigerants, Dai-

kin decided on HFC32 as suitable for split ACs and heat pumps. To gain recognition for HFC32 as a next-generation refrigerant candidate that is effective in lessening environmental impact, Daikin gave free access in September 2011 to its "Basic Patent Essential to Manufacture and Sale of Air-conditioners Using HFC32" for most developing countries in order to prepare an environment in which each country could begin to easily promote the widespread use of HFC32-based ACs.

Source: www.daikin.com

Automated refrigerant reclamation process

Airgas Inc., the United States, has introduced its Airgas Refrigatron™ system for large-scale reclamation of used refrigerant gases. According to the company, Refrigatron technology assures that it properly identifies the contents of returned refrigerant gas cylinders, while delivering efficiencies that make the reclamation process less laborious, and more safe and cost-effective. Refrigatron is a multi-phase system that first allows for the fast analysis and recovery of used refrigerant gases to then be reclaimed to 99.8 per cent purity and resold. It streamlines the processes of moving, analysing, evacuating and storing refrigerants from cylinders containing used refrigerants.

Refrigatron is designed to automate Airgas Refrigerants' standard operating procedures. Using two zero-gravity lifts to move cylinders and two in-line gas chromatograph mass spectrometers, the system renders an ARI-700 specification result and records it for labelling and for future use. Airgas estimates that it achieves much greater accuracy and saves 45 minutes for each cylinder tested using its new mass spectrometer method. The company estimates that an average shift would allow two technicians to test and empty approximately 130 cylinders and evacuate about 2,900 to 3,200 kg of refrigerant.

Source: www.achrnews.com

Environment-friendly CO_2 refrigeration systems

Grocery retailers can reduce energy cost and help protect the global environment by operating refrigeration systems that use carbon dioxide (CO_2) instead of more common refrigerants. In the United States, Singh360 Inc. helps retailers understand the facts related to switching to a CO_2-based refrigeration system. The company is a full-service consulting firm that specializes is facility management, and is independent of energy commodities or equipment suppliers. The company provides counsel from the client's perspective and is objective in recommending the best solutions for the client's goals in energy and maintenance management.

Mr. Abtar Singh, Singh360's President, says: "Supermarkets have been using a class of refrigerants called hydrofluorocarbons (HFCs). The problem is, these HFCs have very high global warming potential (GWP). These days the industry is more inclined to use refrigerants with a lower GWP. CO_2 is a natural refrigerant and also has one of the lowest GWP. For these reasons CO_2 is becoming an obvious choice in the industry."

The services of Singh360 include the following:

- Building-envelope assessments;
- Complete mechanical and electrical design; and
- Renewable energy evaluations for new and existing buildings.

The firm uses computer modelling tools and Singh's own custom refrigeration models in all analyses. The models take into account historical hourly weather data for the locations. They also recommend options based on utility rate structures (including real-time pricing, time of use rates and fixed rates) for the location. *Contact: Mr. Abtar Singh, President, Singh360 Inc., 6330 Troy Lane N, Maple Grove, MN 55311, United States of America. Tel: +1 (651) 605 1093; E-mail: singh360.com.*

Source: www.pr.com

Safety of HFO 1234yf for automotive use

The hydrofluoroolefin refrigerant HFO 1234yf is mildly inflammable, as established through extensive inflammability testing by independent globally recognized third-party laboratories. Furthermore, multiple risk assessments have been carried out by industry stakeholders, including the German automaker Daimler, to thoroughly evaluate the product's inflammability. These have shown that there is no significant additional risk for HFO 1234yf versus current refrigerants, claims DuPont, the United States-based chemicals giant. In support of its claim, Dupont identifies a presentation at the European Automotive Air-Conditioning Convention on 17 September 2012, in Frankfurt, Germany, co-authored by Daimler and presented by the automakers association of Germany (VDA) that concluded HFO 1234yf equipped vehicles to be as safe as those employing R134a – for occupants, mechanics, first emergency responders and fire fighters.

Source: www.racplus.com

Ozone-friendly industrial degreaser

CRC Industries Inc., the United States, offers a new non-corrosive, non-conductive and non-staining solvent for dissolving grease, oil and sludge on mechanical equipment. T-Force has no flash or fire point and evaporates fast, leaving no residue. Featuring a dielectric strength of 33,300 V, the new degreaser is safe for use in poultry and meat plants and contains no Class I or Class II ozone depleting chemicals.

T-Force uses a revolutionary technology that combines the power of an industrial strength, high-performance degreaser with that of a solvent with lower volatile organic compounds (VOCs). It has no fire or flash point and quickly dissolves grease, oil and sludge. *Contact: CRC Industries Inc., 885 Louis Drive, Warminster, Pennsylvania, PA 18974-2869, United States of America. Tel: +1 (215) 674 4300; Fax: +1 (215) 674 2196; E-mail: crcwebmaster@crcindustries.com; Website: www.crcindustries.com.*

Source: news.thomasnet.com

Azeotropic and azeotrope-like solvents

Along with two inventors, E.I. Du Pont de Nemours & Company, the United States, have filed an application for patenting azeotropic or azeotrope-like solvent compositions comprising methylperfluoroheptene ethers (MPHE) and trans-1,2-dichloroethylene. The patent also provides for a method for the removal of residue from a surface of an article by: (a) contacting the article with a composition comprising an azeotrope-like composition of MPHE and trans-1,2-dichloroethylene; and (b) recovering the surface from the said composition. MPHE consists of isomeric mixtures of unsaturated fluoroethers, which are the products of the reaction of perfluoroheptenes such as perfluoro-3-heptene with methanol in the presence of a strong base.

An azeotropic composition is a constant boiling liquid admixture of two or more substances wherein the admixture distils without any composition change. An azeotropic composition has a boiling point that is higher or lower than that of a non-azeotropic mixture of the same substances. Compositions may be formed that comprise from about 0.1 mole per cent to 9.7 mole per cent MPHE and trans-1,2-dichloroethylene. The vapour pressure may range from about 2.1 psia to 207.8 psia, and the temperature from about 0°C to 160°C. In another embodiment of the invention, trans-1,2- dichloroethylene may constitute about 90.3 mole per cent to 99.9 mole per cent. In one embodiment, the present compositions may also include an aerosol propellant (up to about 25 weight per cent of the total composition) or a surfactant. Representative aerosol propellants include air, nitrogen, carbon dioxide, HFO-1234yf, -1234ze, -1225ye, hydrocarbons, etc. Representative surfactants include alkyl phosphate amine salts, ethoxylated alcohols, alkylphenols, quaternary ammonium salts of alkyl phosphates and mono- or di-alkyl phosphates of fluorinated amines.

Source: www.sumobrain.com

Non-chlorinated cleaner

CUT non-chlorinated cleaner from Stoner Inc., the United States, is a powerful, fast-acting precision cleaner-degreaser that removes grease, oils, waxes, inks, tars and silicone oils from tools, equipment, moulds, metal parts, etc. Developed as an alternative to chlorinated precision cleaning solvents, CUT does not contain any chlorinated solvents like 1,1,1 trichloroethane, trichloroethylene or dichloromethane, or ozone depleting Class-I (chlorofluorocarbon, CFC) or Class-II (hydrochlorofluorocarbon, HCFC) substances.

CUT dissolves and flushes away most release agents from metal moulds, cleaning and preparing moulds prior to application of rust preventives. It contains powerful cleaning agents to remove grease, oil, carbon deposits, tar, gum, ink, dirt, wax, silicones adhesives and more. It is quick-evaporating, dries fast and leaves no residue. CUT will not harm metals and other solvent-resistant materials. It removes finger marks and displaces moisture. *Contact: Stoner Inc., 1070 Robert Fulton Highway, Quarryville, PA 17566, United States of America. Tel: +1 (717) 786 7355; Fax: +1 (717) 786 9088; E-mail: timesaver@stonersolutions.com.*

Source: www.criticalcleaning.com

Aqueous aerosol cleaner/degreaser

Mirachem® 500 Foaming Aerosol Cleaner/Degreaser, from Mirachem Corporation, the United States, is designed for a variety of critical cleaning applications in aviation and aerospace, in process cleaning for manufacturing, as well as in industrial process applications. The product is a concentrated, aqueous cleaner developed to clean oil, grease, carbon, lubricants, metalworking fluids and other organic soils. Mirachem 500 delivers advanced industrial-strength cleaning and degreasing with accelerated safety and material compatibility

benefits. It is safe for use on acrylic, plastics, carbon composites, most metals, neoprene, rubber, fibreglass and painted surfaces.

Mirachem 500 does not contain acids, alkalis or other known hazardous ingredients, and has been tested for non-toxicity to standards set by the United States Environmental Protection Agency (EPA) Occupational Safety and Health Administration (OSHA). The non-inflammable, non-combustible, non-fuming and non-corrosive cleaner is free of any ozone depleting or global warming compound. It also excludes Volatile Organic Hazard Air Pollutants (VOHAPs), but contains Volatile Organic Compounds (VOCs) at 75-25 g/L at 2:1 dilution. *Contact: Mirachem Corporation, P.O. Box 14059, Phoenix, Arizona, AZ 85063, United States of America. Tel: +1 (602) 272 6066; Fax: +1 (602) 353 1411; E-mail: support @mirachem.com.*

Source: www.mirachem.com

Bi-solvent-based cleaning of precision components

Crest Ultrasonics Corporation, the United States, has received patent on a bisolvent cleaning system for cleaning precision components without any solvent containing Volatile Organic Compounds (VOCs). The bisolvent cleaning system provides for a twin-mode operation for cleaning and rinsing precision components using solvents that is as effective as VOC solvent-based systems while subsequently allowing for the recovery and reuse of the solvent.

The invention aims to create a suitable cleaning system and suitable cleaning methods for cleaning precision components while utilizing a solvent reclamation process to reduce solvent discharge while recovering solvents for reuse and/or disposal. In one representative embodiment, the two solvents are both VOC-exempt. An operation mode comprises cleaning a precision component in a tank containing the first VOC-exempt solvent to remove any soil, particulate matter, grease or other contaminant from the precision component, followed by rinsing of the component in another tank containing the second VOC-exempt solvent to remove any film left on the precision component by the first solvent.

During the operation mode, the cleaning and rinsing steps can each comprise subjecting the precision component to oscillation and ultrasonically induced cavitation within the corresponding solvent to assist further with cleaning and rinsing. The solvent recovery mode comprises separating the first VOC-exempt solvent, removed as part of the rinsing step, from the second VOC-exempt solvent and reclaiming either or both solvents. The second solvent can have a kauri-butanol value of about 10-150, and comprise an engineered solvent such as, for instance, Novec™ Engineered Fluid HFE-7200, which has a boiling point of 61°C and a wide liquid range from -135°C to 61°C.

Source: www.freepatentsonline.com

"Clean and green" parts washer

ChemFree Corporation, the United States, has launched the BenchtopPRO™, the first and only parts washer that uses non-heating bioremediation. The BenchtopPRO Bioremediating Parts Washer is aimed at the garage and small repair shop market. It combines the process of bioremediation with a revolutionary, non-inflammable, non-toxic, degreasing solution engineered to work at room temperature, tackling the most challenging parts washing needs.

The patent-pending, self-contained washing system's unique design and rock-solid construction create an easy-to-use and easy-to-store system built to clean greasy, dirty and oily parts. In operation, the parts to be cleaned are introduced into the system and worked on by a self-cleaning brush. A degreasing fluid, housed within the double wall construction of the unit, is recirculated by a pump and to the brush. The degreasing fluid continually cleans itself through bioremediation, so that it is ever ready to be used. The cleaned parts are then placed in the drying station, a wire rack inset into the lid.

The BenchtopPRO comes complete with: a re-circulating pump; a flow-through brush; 3.8 L of industrial-strength, non-hazardous, non-inflammable, non-irritating, pH neutral Concentrate BT5 Degreasing Solution; and four MicroPRO Packs, the revolutionary microbial treatment. *Contact: ChemFree Corporation, 8 Meca Way, Norcross Georgia, GA 30093, United States of America. Tel: +1 (770) 564 55 89; Fax: +1 (770) 564 5533; E-mail: mpage@chemfree.com; Website: www.thebenchtoppro.com.*

Source: www.prweb.com

Solar Chill

Solar Chill is a global initiative that is developing an ozone-friendly vaccine cooler run by solar energy, aiming to help improve the health of children in developing countries. The technology is publicly owned and will be freely available for any company in the world. For more information, access:

http://www.solarchill.org

Alternative pharmaceutical propellant

The United States-based DuPont has introduced Dymel® 134a/P, a non-ozone-depleting alternative propellant for pharmaceutical applications. Dymel 134a/P, available for commercial use, is manufactured in total compliance with the current Good Manufacturing Practices (cGMP) of the United States Food and Drug Administration (FDA), and meets the requirements of health authorities worldwide. The chemical composition of Dymel 134a/P is 1,1,1,2-tetrafluoroethane (HFA-134a) and the pharmaceutical grade has stringent purity standards.

DuPont supported the International Pharmaceutical Aerosol Consortium (IPACT-1) seeking alternative propellants for metered-dose inhalers (MDIs). This included the supply of Dymel 134a/P to IPACT-1 and individual pharmaceutical companies for toxicological and clinical evaluation. It also involved interaction with worldwide health authorities to ensure compliance with pharmaceutical requirements and governmental guidelines. DuPont claims that Dymel 134a/P has received affirmation from governmental bodies worldwide for its use in MDIs and other pharmaceutical applications.

Source: www2.dupont.com

Efficacy of HFA nasal aerosol established

Teva Pharmaceutical Industries Ltd., Israel, has announced that additional data from the Phase III clinical programme for QNASL® (beclomethasone dipropionate) Nasal Aerosol establish the efficacy of the formulation. QNASL is a recently approved dry nasal aerosol corticosteroid that treats seasonal and year-round nasal allergy symptoms in adults and adolescents 12 years of age and older. Findings from one clinical study highlight the nasal symptom improvement and efficacy profile of QNASL in children aged 6-11 with seasonal allergic rhinitis (SAR), while others reinforce ocular safety, appropriate dosing and device performance. QNASL is delivered as a once-daily, non-aqueous aerosol that uses hydrofluoroalkane (HFA), an environmentally friendly propellant, and incorporates a built-in dose counter.

Dr. William Storms, a clinical professor at the University of Colorado Health Sciences Centre, the United States, said that the dry mode of delivery of QNASL, along with the performance and functionality of the device, offered patients a safe and effective way to manage and control their symptoms of nasal allergy.

Source: www.eurekalert.org

Propellant-free inhalation spray

Active ingredients of dual-action Combivent® (ipratropium bromide and albuterol sulphate) Inhalation Aerosol, from Boehringer Ingelheim Pharmaceuticals Inc., the United States, is now available in a new propellant-free inhaler. Combivent Respimat is a propellant-free inhaler that uses a slow-moving mist to deliver the active ingredients as does Combivent metered dose inhaler (MDI). The prescription drug is indicated for use in patients with chronic obstructive pulmonary disease (COPD) who are on a regular aerosol bronchodilator. Combivent Respimat requires one inhalation/dose unlike Combivent MDI, which requires two inhalations/dose. The new product features a dose indicator to inform patients of the amount of remaining medication in the inhaler, and the device locks when all of the medication has been used up. A 12-week, randomized, double-blind, placebo and active-controlled clinical trial demonstrated Combivent Respimat to be clinically comparable to Combivent MDI in all salient aspects.

Source: us.boehringer-ingelheim.com

Nanogram-dose inhalers

Pearl Therapeutics Inc., the United States, has successfully formulated and manufactured metered-dose inhalers (MDI) that deliver at each actuation precisely 300 ng of glycopyrrolate (GP), a highly potent, long-acting muscarinic antagonist. Pearl has used its porous particle co-suspension technology to break the microgram dose barrier for potent medicines inhaled via MDIs – a goal that has eluded respiratory drug developers since the introduction of MDIs in the 1950s and dry powder inhalers in the 1960s. Pearl has initiated a randomized, double-blind Phase 2b study of GP delivered twice a day via MDI using hydrofluoroalkane (HFA) propellant, which is an effective alternative to chlorofluorocarbon (CFC) propellants. GP is currently being developed by Pearl as a stand-alone product, and as a part of Pearl's lead combination therapy for chronic obstructive pulmonary disease. *Contact: Pearl Therapeutics Inc., 200 Saginaw Drive, Redwood City, California, CA 94063, United States of America. Tel: +1 (650) 305 2600; Fax: +1 (650) 568 1804; E-mail: info@pearltherapeutics.com.*

Source: www.pearltherapeutics.com

Lightweight microcellular polyimide foams

Over the past decades considerable efforts have been put forth to fabricate lightweight polyimide (PI) foams, considering their superior heat-resistance, flame retardancy and less smoke generation, which find them in many advanced applications such as aerospace, submarines, high-speed trains and special ships. However, most PI foams have cell sizes in the range of millimetres. The mechanical properties of these foams are usually much weaker than those of the solid polymers. Glass fibre-plastic honeycombs and aramid paper honeycombs sandwich could offer very unusual properties to military aircraft, but very high costs restrict their use.

Polyimide bead foam sheets

At the Ningbo Institute of Material Technology & Engineering (NIMTE) of the Chinese Academy of Sciences, researchers have developed a novel way to make PI bead foams using a mixture of physical blowing agent. By increasing the gas solubility in PI matrix and improving cell nucleation, the researchers have successfully developed a PI foaming technology. The resultant PI bead foams present high expansion ratio of 50-60 times and well-defined cell morphology.

As the foaming process did not affect the molecular character of the commercialized PI resin, the PI foams could maintain the excellent properties of PI resins, such as high service temperature of 180°-220°C, self-extinguishing property, good chemical stability, etc. Furthermore, processing is easy and production cost low. The PI bead foams can be moulded into the 3-D samples. The moulded PI bead foam (EPI) exhibits good dimensional stability at 180°C and low thermal conductivity of ~0.03 W/m.k. *Contact: Mr. Zhai Wentao, Associate Professor, Ningbo Key Lab of Polymer Materials, Ningbo Institute of Material Technology & Engineering, Chinese Academy of Sciences, Ningbo, Zhejiang Province, 315201, China. E-mail: wtzhai @nimte.ac.cn.*

Source: english.cas.cn

Extruded styrenic foam sheet patents

In the United States, MuCell Extrusion LLC and Styron have concluded an agreement under which MuCell Extrusion will acquire access to Styron's patent portfolio for extrusion of styrenic resins. The combination of Styron's CO2RE™ technology and MuCell's expertise around technology and hardware is expected to help customers improve their competitive advantage in a shorter timeframe. Sheet for thermoforming, roll stock, panelling and high volume packaging will all see significant cost reductions by applying this technology.

According to Mr. John Case, Styrenics Global Marketing Manager, Styron, CO2RE is a "patented plastic foaming technology that produces polystyrene sheets with a foamed core layer using physical blowing agents". The technology can improve the sustainability of packaging by reducing the density and weight of their product packaging. It also provides benefits in reduced energy and reduced raw material usage.

MuCell technology is based on the direct injection of atmospheric gas (nitrogen or carbon dioxide) in its supercritical state. MuCell says it has applied this technology to most plastic materials and processes. Rigid sheet, low-density flexible sheet, blown film, cast film, pipe/tubing/profile, and blow moulding manufacturing processes are all current applications using MuCell technology. MuCell's innovative and accessible technology brings significant material weight savings and cost reduction opportunities, without compromising physical product performance. *Contact: MuCell Extrusion LLC, 212 West Cummings Park, Woburn, Massachusetts, MA 01810, United States of America. Tel: +1 (859) 647 8861; E-mail: m.lindenfelzer@mucell.com.*

Source: www.zotefoams.com

Foaming agent master batches

Astra Polymers from the Kingdom of Saudi Arabia offers a wide range of master batches that contain a variety of foaming agents. These foaming agent master batches provide the processor with a means of metering precise quantities of the active ingredients. The advantages of the foaming agents include:

- Weight reduction;
- Savings in raw materials;
- Elimination of sink marks and warpage;
- Sandwich effect (giving better wall toughness); and
- A range of surface finishes and textures.

Foaming agent master batches are compounds that decompose at

elevated temperatures forming gas and other inert components that expand the plastic material giving it a cellular structure. Besides weight reduction, this process offers better acoustical properties, better insulation, as well as cost savings. These can be further divided into exothermic foaming agents and endothermic foaming agents. Exothermic foaming agents are usually used for larger parts while endothermic foaming agents can be used for tapes, film sheet and for removal of sink marks in moulded parts.

Endothermic foaming agent master batches are based on carbonates/citric acid, generate carbon dioxide and water vapour, and react by absorbing heat energy, which leads to uniform and fine cell structure, smooth surface, reduction in cycle times and rapid degassing without causing any discolouration. These are especially useful for foam extrusion, foam injection moulding and foam blow moulding. Exothermic foaming agent master batches, which are systems are based on azodicarbonamides, liberate nitrogen, carbon monoxide and ammonia. These generate heat when the gas formation commences. *Contact: Astra Polymers Compounding Co. Ltd., P.O Box 30740, Al Khobar 31952, Kingdom of Saudi Arabia. Tel: +966 (3) 8121232; Fax: +966 (3) 8121342; E-mail: info@astra-polymers.com.*

Source: www.astra-polymers.com

Polyurethane foam blown with cyclopentane

At Bayer MaterialScience LLC, the United States, scientist Dr. Steve Aprahamian studied the relationship between various processing variables and key physical properties of experimental polyurethane foam systems blown with cyclopentane. Dr. Aprahamian chose two analogous polyurethane systems to study, including a typical cyclopentane-based system that would be used to manufacture rigid insulation for appliances, and an optimized system based on an increased catalyst level. During the experiment, he compared the two systems for string-gel time, minimum fill density, demould performance, core density, dimensional stability, thermal conductivity and compressive strength.

"Developing a polyurethane system involves many compromises," explained Dr. Aprahamian. "There is a balance of robustness of the system to allow large processing windows versus optimization of key performance indicators," he continued, stressing that in addition to that balance, it is important to be aware of not only key independent variables that can be directly controlled, but also key dependent variables that can affect other dependent variables.

Source: www.bayermaterialsciencenafta.com

Tetrafluorobutene blowing agent compositions

Arkema Inc., the United States, reports a blowing agent for thermosetting foams – 2,4,4,4-tetrafluorobutene-1, which is used alone or in combination with a hydrocarbon, hydrofluoroolefin (HFO), hydrofluorocarbon (HFC) or hydrochlorofluoroolefin (HCFO). The HFO blowing agent has negligible (low or zero) ozone depletion potential (ODP) and low global warming potential (GWP). The blowing agent, alone or in a combination with additional HFOs, can be used as a foaming agent for thermosetting foams by being mixed in a polyols mixture. The resulting products show superior qualities, including decreased density and improved k-factor. The 2,4,4,4-tetrafluorobutene-1 foaming agent readily dissolves in thermosetting polymers and provides a degree of plasticization sufficient to produce acceptable foams. The blowing agent is a liquid at ambient temperature, allowing for ease of handling.

Source: patentscope.wipo.int

Ecological foam insulation

EcoTech foam injection filling from Insulated Roller Shutter Products, the United Kingdom, is a rigid, high-density foam that is free of chlorofluorocarbon (CFC). EcoTech has no ozone depletion potential (ODP) and a low Global Warming Potential (GWP) value of 3. The foam has insignificant thermal conductivity or heat transfer through convection, due to the high-density, closed cell nature of the EcoTech foam insulation. This provides high energy efficiency for the insulation.

The EcoTech foam insulation is self-bonded to the metal of roller shutter doors during the injection process, giving the completed panel a remarkable mechanical strength, combining a significant increase in rigidity and improving its structural integrity. The product also has high compressive and shear resistance. This means that 25 mm of rigid EcoTech foam insulation is equivalent to 40 mm of conventional polystyrene insulation, according to the company. *Contact: Insulated Roller Shutter Products, Old Bush Street, Off Level Street, Brierley Hill, West Midlands, DY5 1UB, United Kingdom. Tel: +44 (1384) 265177; Fax: +44 (1384) 265456; E-mail: sales@irsp.co.uk.*

Source: www.irsp.co.uk

High-voltage heat treatment of export logs

Timber logs for exports are usually fumigated to rid the timber of pests, such as insects and fungi, which could degrade the timber and/or pose a biosecurity threat. Methyl bromide has been the most common fumigation used before the global drive to reduce and eventually eliminate its use, owing to its role in ozone depletion. Heat treatment is a well accepted alternative treatment for logs held in quarantine, and is usually performed by dry heating in a kiln or heating with steam.

At the Electric Power Engineering Centre (EPEC) of University of Canterbury (UC), New Zealand, researchers have developed a new method of using electricity directly for the heat treatment of logs. UC researchers headed by Dr. Bill Heffernan, Adjunct Senior Fellow in EPEC, applied high-voltage electricity between the ends of logs in tests, causing rapid heating of the log. A minimum core temperature had to be maintained for a minimum period to achieve eradication of pests, said Dr. Allan Miller, the Director of EPEC. As care needs to be taken to avoid damage to the timber by overheating during electric heating, the new technology contains electric power monitoring and control.

Source: www.starcanterbury.co.nz

Alternatives to methyl bromide in agriculture

In the agriculture sector, greenhouse system is among the best alternatives to the effective but ozone-depleting fumigant methyl bromide (MBr). Southern Development Company (SDC) is the first company, and currently the only company, in Fiji to phase out MBr using the greenhouse system. According to SDC, the greenhouse system offers high crop yield (98 per cent in seedling production per harvest compared with 65 per cent growth when using MBr) and cost savings (lower labour requirement and less crop loss). Fiji's Department of Environment's Methyl Bromide Consultative Working Group is considering hydrogen cyanide and phosphine as alternatives to MBr. Evaluations of safety and efficacy of the two chemicals are yet to be made.

Source: www.environment.gov.fj

Thermal pesticidal process

The Thermal Remediation® process developed by Temp-Air Inc., the United States, kills pests by creating a positive pressure within the structure being treated while maintaining it at a high temperature. The patented process involves increasing the internal temperature of the structure to 49°-60°C through hot air flow to achieve temperatures lethal to insects at all life stages while maintaining the pressure using 100 per cent outside air. The process uses a combination of direct-fired (natural gas, propane or steam-fuelled) make-up heaters, fans and ductwork, to control the flow of air and maintain uniform temperatures throughout the treatment area.

The positive pressure throughout the treated space pushes hot air into corners, cracks and crevices, making it virtually impossible for pests to hide anywhere. The dry heat produced is held evenly in the treated space for up to 24 hours. During this 24-hour period, frequent inspections are carried out to monitor insect activity and to identify any cold pockets that need fixing. Afterwards, the treatment area is cooled down. The entire heat treatment of a structure is completed in less than 36 hours. *Contact: Temp-Air Inc., 3700 West Preserve Boulevard, Burnsville, MN 55337, United States of America. Fax: +1 (952) 707 5297; Website: www.temp-air.com.*

Source: www.thermalremediation.com

Biopesticide for post-harvest food grain stores

Exosect, a leading provider of integrated pest management solutions in the United Kingdom, is developing a unique biopesticide technology for controlling insect pests in grain stores. The formulation comprises Exosect's platform technology, Entostat powder, a unique food-grade wax powder that acts as a delivery mechanism for a range of active ingredients, and *Beauveria bassiana,* a entomopathogenic fungi.

The bio-pesticide is being developed to address the issue of waste in post-harvest grain stores that is caused by insect pests' growing resistance to insecticides and residues in food. *B. bassiana* is found naturally in the United Kingdom soil and grain stores and is active against grain beetles, weevils and other major stored grain insects. A naturally occurring organism, *B. bassiana* is very effective and safe but can be difficult to produce and maintain. Delivering an effective dose to the target pest has until now proven to be a significant barrier due to its limited shelf life, which makes this formulation a significant breakthrough.

Source: www.prlog.org

Low Cost Options for the use of Hydrocarbons in the Manufacture of Polyurethane foams

There is an urgent need to assess potential alternative technologies for replacing the hydrochlorofluorocarbon (HCFC) HCFC-141b in terms of properties, costs, availability, sustainability and environmental performance. This report, prepared by the United Nations Development Programme (UNDP) based on the results of a pilot project funded by the Multilateral Fund, analysed the viability and potential of using hydrocarbons as HCFC alternative in polyurethane foam. Hydrocarbon technology is available worldwide, but its implementation requires considerable capital outlays, mainly related to safety issues. On the other side, operating costs are generally somewhat lower than HCFCs. The objective of this pilot project has been to assess options to lower these capital costs without compromising benefits.

Contact: United Nations Development Programme, One United Nations Plaza, New York, NY 10017, United States of America. Tel: +1 (212) 906 5000; E-mail: publications.queries@undp.org.

Blowing Agents and Foaming Processes 2012: Conference Proceedings

These proceedings contain all the presentations from this conference, which is now in its fourteenth consecutive year. As the only conference tailored to the specific needs of the polymeric foam industry, this event provided a forum for speakers to showcase new materials and processing technologies that will improve current application performance and benefit from improving or replacing existing material and process selections. As raw material costs continue to pose a significant economic challenge to manufacturers in high volume markets, end-users are increasingly sourcing novel, cost-effective material alternatives. Today, there are numerous solutions on offer, and it seems that demand for higher performance and lower costs is set to once again drive technical developments in polymeric foams.

Contact: Smithers Rapra, Shawbury, Shrewsbury, Shropshire, SY4 4NR, United Kingdom. Tel: +44 (1939) 252313; E-mail: publications@smithersrapra.com.

05-07 Mar
HCM City
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PS/HVACR VIETNAM 2013
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07-09 Mar
Mumbai
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ACREX 2013
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06-09 Apr
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China

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E-mail: ICCR2013@zju.edu.cn;
Website: www.doe.zju.edu.cn/ICCR2013.

14-15 May
Mainz
Germany

Blowing Agents and Foaming Processes 2013
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09-13 Oct
Bangkok
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BANGKOK RHVAC 2013
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Website: www.bangkok-rhvac.com.

12-14 Nov
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Indonesia

HVACR INDONESIA 2013
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Singapore 238164.
Tel: +65 6411 7777;
Fax: +65 6411 7778;
E-mail:info@psseries.com;
Website: hvacrseries.com/indonesia.

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