VATIS UPDATE

Ozone Layer Protection

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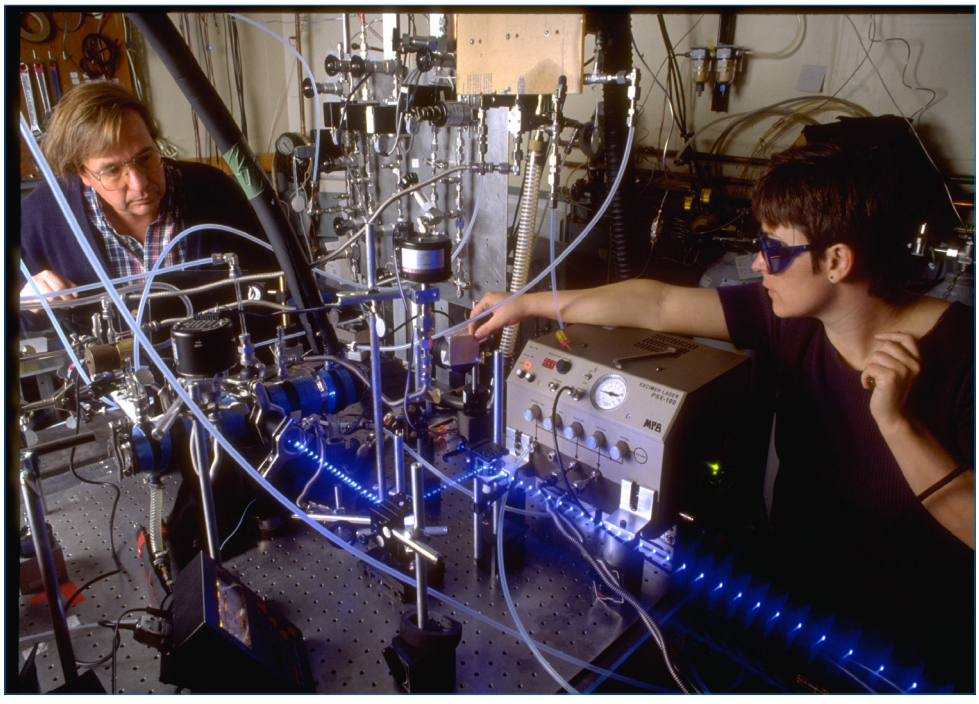
Apprise yourself with the latest technological innovations

Highlights

- Antarctic ozone hole about average in 2016
- New refrigerant for mobile air conditioning
- Multi-purpose cleaner
- Innovative fire suppression solution
- Liquid blowing agent
- Postharvest vegetable treatment



APCTT
Asian and Pacific Centre for Transfer of Technology

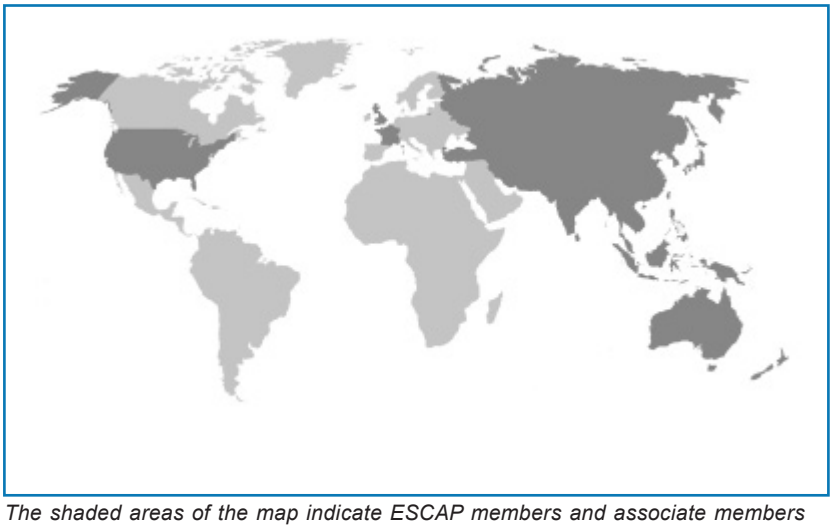
UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Ozone Cell
Ministry of Environment, Forest & Climate Change
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

Researchers measure the global warming potential and ozone depleting potential of chemicals that various industries are considering as replacements for known ozone-depleting chemicals

(Credit: NOAA, USA)

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 about average in 2016

According to scientists from NASA and the National Oceanic and Atmospheric Administration (NOAA) who monitor the annual phenomenon, the hole in the Earth's ozone layer that forms over Antarctica each September grew to about 8.9 million square miles in 2016 before starting to recover. "This year we saw an ozone hole that was just below average size. What we're seeing is consistent with our expectation and our understanding of ozone depletion chemistry and stratospheric weather," said Paul A. Newman, at NASA.

At its peak on September 28, the ozone hole extended across an area nearly three times the size of the continental United States. In 2015 the ozone hole grew to 10.9 million square miles, 2 million square miles larger than this year, before returning to relatively normal summer levels. Its larger size last year was due to colder-than-average temperatures in the stratosphere that amplified the destruction of ozone by sunlight reacting with chlorine and bromine from man-made chemicals. In 2016, warmer stratospheric temperatures constrained the growth of the ozone hole.

During the 1960s, before the Antarctic ozone hole occurred, average ozone concentrations above the South Pole ranged from 260 to 320 Dobson units. This year's Antarctic ozone hole is similar to the 2013 hole which reached 9.3 million square miles. Although warmer than average stratospheric weather conditions reduce ozone depletion, the current ozone hole area is large compared to the 1980s, when the depletion of the ozone layer above Antarctica was first detected. This is because levels of ozone-depleting substances (ODS) remain high enough to produce significant ozone loss.

Source: http://www.research.noaa.gov

Measuring and monitoring ozone from space

The hole in the ozone layer over Antarctica became an international cause for concern in the latter half of the 20th Century, but as European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) Atmospheric Composition Product Development Team Leader Dr. Christian Retscher points out, issues relating to ozone levels are complex and wide-reaching.

EUMETSAT's Metop-A (launched in 2006) and Metop-B (2012) satellites, flying in a sun-synchronised polar orbit approximately 817km above the Earth's surface, carry an instrument called GOME-2 (Global Ozone Monitoring Experiment), which is dedicated to measuring ozone in the atmosphere.

"The primary goal is to measure how the ozone layer is changing in general, not only the so-called ozone hole over Antarctica. There, meteorological conditions favour the accelerated depletion of stratospheric ozone, but ozone is thinning over the Arctic as well. "When we look at how the ozone is behaving over the long term, what we hope to see is that stratospheric ozone is recovering somewhat. "Specifically, measurements from the last couple of years hint at a slight recovery of the stratospheric ozone layer over the South Pole," explained Christian.

The GOME-2 instruments are dedicated to monitoring ozone but are not the only satellite-borne instruments taking ozone measurements. Metop satellites also carry the Infrared Atmospheric Sounding Interferometer (IASI) instruments, which measure ozone as well. Other relevant European ozone-monitoring instruments were GOME on ERS-2 , or SCIAMACHY, MIPAS and GOMOS, which were flown on ESA's Envisat satellite.Planning is well in hand to continue monitoring ozone into the future.

Source: https://www.sciencedaily.com

Impacts of stratospheric warming on Arctic ozone

A team of researchers from Universities Space Research Association, and NASA Goddard Space Flight Center, the United States, used the Global Modeling Initiative (GMI) chemistry and transport model with Modern-Era Retrospective Analysis for Research and Applications (MERRA) meteorological fields to quantify heterogeneous chemical ozone loss in Arctic winters 2005–2015. Comparisons to Aura Microwave Limb Sounder N_2O and O_3 observations show the GMI simulation credibly represents the transport processes and net heterogeneous chemical loss necessary to simulate Arctic ozone.

Source: http://onlinelibrary.wiley.com

India celebrates International Ozone Day

The Ozone Cell of the Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India celebrated International Ozone Day on September 16, by awarding young schoolchildren for participating and winning in painting, poster-making and slogan writing competitions organised by the ministry. On this occasion, the Ministry released a report 'The Montreal Protocol: India's Success Story', detailing the Indian endeavours in phasing out harmful CFC (Chlorofluorocarbons), used in electrical appliances.

"CFC has been replaced by HFC (Hydrocflourocarbon) completely. We have stopped using harmful gases... according to estimates we will have completely done away with HCFCs (Hydrochloroflourocarbon) too, by the year 2025," said Ajay Mathur, at The Energy and Research Institute (TERI). "HFCs are good in that they don't contribute to ozone depletion, but they emit greenhouse gases, causing an increase in global warming. This increase will have a global impact, including India where floods and droughts will become more frequent," he added.

Source: http://www.economictimes.indiatimes.com

New HFC-reduction target

According to an IndiaSpend calculation, India`s participation in a global agreement on climate change will reduce the country's greenhouse gases equal to closing one-sixth of its thermal power stations over the next 35 years. It is based on carbon-dioxide (CO_2) equivalent emissions from thermal power stations in 2012. As many as 197 countries reached a legally binding agreement in Rwanda on October 15, 2016, to phase down the production and consumption of hydrofluorocarbons (HFCs) gases that can have global warming potential (GWP) up to 12,000 times more than CO_2.

The agreement will come into force on January 1, 2019 and avoid emission of 70 billion tonnes of CO_2 equivalent globally – the same as stopping more than half of tropical deforestation. India agreed to cut the production and use of HFCs starting in 2028 – a more ambitious plan than its earlier proposal – according to Climate Action Network International, a network of NGOs working to limit climate change. "India will reduce 75% of its cumulative HFC emissions between 2015 and 2050, under the new agreement finalised in Rwanda," said Vaibhav Chaturvedi, at Council on Energy, Environment and Water (CEEW), India.

The new agreement for HFC reduction for a group of countries – which includes India, Pakistan, Iran and Iraq – is more ambitious that the previous Indian proposal for developing countries but less intensive that the North American proposal. India had earlier proposed a plan for developing countries to freeze HFC consumption by 2031, which means HFC use and production would be highest in that year, and decrease every year after 2031.

Source: http://www.zeenews.india.com

R&D project for HFC refrigerant alternatives

The Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India, announced an ambitious collaborative R&D programme to develop next generation, sustainable refrigerant technologies as alternatives to HFCs. This R&D initiative brings together Government, research institutes, industry and civil society to develop long term technology solutions to mitigate impact of currently used refrigerant gases on the ozone layer and climate. With this initiative, India reaffirms its commitment to working with all other nations to safeguard the Earth's natural ecosystem.

Some of the key players include the Council of Scientific & Industrial Research (CSIR) and its allied institutions; Department of Science and Technology; Centre for Atmospheric & Oceanic Sciences; as well as key industry players in the sector. Members of this initiative have already had multiple rounds of consultation to reach a consensus on the contours and decide on the roadmap for this initiative. India has a small carbon footprint at citizen level and its sustainable lifestyle results in low contribution of the country to overall emissions of greenhouse gases and ozone depleting substances (ODS), as compared with other developed countries.

However, there is an urgent need for developing new technologies indigenously as alternatives available today are patented apart from being expensive. A research based programme to look for cost effective alternatives to the currently used refrigerant gases is, therefore essential.

Source: http://www.pib.nic.in

Countries agree to curb HFCs

Nearly 200 countries have struck a landmark deal to reduce the emissions of powerful greenhouse gases (GHG), hydrofluorocarbons (HFCs), in a move that could prevent up to 0.5 degrees Celsius of global warming by the end of this century. The amendment to the Montreal Protocol on substances that deplete the ozone layer recently endorsed in Kigali is the single largest contribution the world has made towards keeping the global temperature rise "well below" 2 degrees Celsius, a target agreed at the Paris climate conference in 2016.

Following 7 years of negotiations, the 197 Montreal Protocol parties reached a compromise, under which developed countries will start to phase down HFCs by 2019. Developing countries will follow with a freeze of HFCs consumption levels in 2024, with some countries freezing consumption in 2028. By the late 2040s, all countries are expected to consume no more than 15-20 per cent of their respective baselines. Countries also agreed to provide adequate financing for HFCs reduction, the cost of which is estimated at billions of dollars globally.

The exact amount of additional funding will be agreed at the next Meeting of the Parties in Montreal, in 2017. Alternatives to HFCs currently being explored include substances that do not deplete the ozone layer and have a smaller impact on the climate, such as ammonia or carbon dioxide (CO_2). Super-efficient, cost effective cooling technologies are also being developed, which can help protect the climate both through reducing HFCs emissions and by using less energy.

Source: http://www.unep.org

UNIDO to help Iran phase-out ODS

United Nations Industrial Development Organization (UNIDO) aims to assist Islamic Republic of Iran in assessing impact of energy, environmental policies on industrial development. With regard to Montreal Protocol, with the assistance of UNIDO, the Government of Iran was one of the first to meet the 2015 HCFCs phase-out target. HCFCs are ozone depleting substances (ODS) which are utilized in everyday life, including in refrigerators and air conditioning devices.

In this regard, in an effort to integrate ozone-layer protection with industrial development, UNIDO introduced hydrocarbon technology in Iran's polyurethane foam production. This technology protects the ozone layer and reduces the negative impact of polyurethane foam manufacturing on climate change. In addition, the project has created a number of jobs because the equipment used is entirely manufactured in Iran.

Source: http://www.en.mehrnews.com

Responsible aircon disposal in the Philippines

Concepcion Industrial Corporation (CIC), Philippines, through its subsidiary Concepcion-Carrier Air Conditioning Company (CCAC) has partnered with Meralco, Philippines, in promoting responsible air conditioning unit disposal and recycling with its Aircon Trade-in Program. Most people with old air conditioners continue to use their own units without knowing that they actually consume as much as 50 percent more electricity.

There are also those who resort to selling their old units to junk shops without thinking about the negative impact to the environment brought about by the harmful chemicals. With CIC's AC Trade-in Program, the harmful chemicals contained in old air conditioning units are carefully extracted by a DENR accredited agency and turned over to the DENR for proper disposal. Metal and plastic parts are also appropriately recycled by the same DENR accredited agency.

With CIC's AC Trade-in Program, customers also get to enjoy discounts on new, environmentally balanced AC models by trading in their older units. They simply have to present the AC Trade-in Program coupon sent with their Meralco electricity bills along with old air conditioners of any brand to accredited service centers, where they will receive cash vouchers which they can use to get discounts on selected window-type air conditioning products.

Source: http://www.manilatimes.net

Philippines on track with ODS phase-out

The Philippines has made significant strides to ensure the protection of the ozone layer in compliance with the Montreal Protocol, particularly in the phase-out of ozone depleting substances (ODS). Coinciding with the local celebration of World Ozone Day, the Department of Environment and Natural Resources (DENR) has announced that the government was able to meet the targets

in phasing out all ODS, except for hydrofluorocarbons (HCFCs).

"The country also began reducing the production and use of HFCs by 10 percent in 2016 until the total ban of the last remaining ODS by 2040," said Analiza Rebuelta Teh, at DENR. The Philippines signed the Montreal Protocol on substances that deplete the ozone layer on Sept. 14, 1988 and ratified it on March 21, 1991. As a party to one of the most effective environmental treaties ever, the country agreed to the gradual phase-out of ODS, particularly CFCs and HCFCs.

The Philippines imposed a ban on the importation of CFCs and HCFCs in 2010 and 2013, respectively. In 1994, the Philippine Ozone Desk (POD) was created to facilitate and coordinate ODS phase-out projects and policies for the overall implementation of the country's obligations under the Montreal Protocol. The POD is under the Environmental Management Bureau, an attached agency of the DENR. Since ODS are not produced in the Philippines, the focus of its regulation was on the import, processing, sale and disposal of such chemicals.

Source: http://www.manilatimes.net

Viet Nam-UNIDO cooperation in reducing ODS

At a series of events held in Hanoi and Ho Chi Minh, the results of cooperation between Viet Nam and the United Nations Industrial Development Organization (UNIDO) in the field of reducing greenhouse gases and ozone depleting substances (ODS) were discussed. The workshops were organized in celebration of the International Day for the Preservation of the Ozone Layer.

The recent ozone- and climate-friendly developments in Vietnamese factories include the successful conversion from the use of hydrochlorofluorocarbons (HCFCs), which are ODS commonly used in refrigeration, to a new technology system using HC-290, a natural refrigerant. Such conversion has resulted in energy savings of up to 30 per cent.

The new technology also offers a much better cooling performance, is easier to use and needs less space. As an implementing agency of the Multilateral Fund for the Implementation of the Montreal Protocol, UNIDO facilitates awareness-raising activities in Viet Nam and provides relevant technical assistance and policy consultations.

Source: https://www.unido.org

Bangladesh takes steps to phase-out HCFCs

Bangladesh Ministry of the Environment took the first steps for developing the Stage 2 strategy for HCFC phase-out. This assumes more importance because of the recently concluded Kigali amendment. The UNDP led Stage 2 with the cooperating Agency UNEP will assist the country to not only meet their 2020 and 2025 control measures but also strategize how to address HFC phase down as well.

For developing the non-investment component for Stage 2 the first stakeholder workshop was organized on 1 October 2016 in Dhaka. It was attended by most of the key stakeholders like Central Procurement Technical Unit, Bangladesh Standards and Testing Institute (BSTI), BRAMA, Bangladesh Korea Technical Institute, Bangladesh Frozen Food Exporters Association in addition to representatives of large and small industries, equipment importers Association, and various units of the Ministry of Environment. UNDP also participated in the workshop.

Source: http://www.unep.org

Myanmar to reduce ODS

At a ceremony in Nay Pyi Taw marking International Ozone Preservation Day, Myanmar's permanent secretary of the Ministry of Natural Resources and Environmental Conservation announced that the Myanmar will work with other countries to reduce usage of ozone-depleting substances (ODS). A Hydrofluorocarbons Phase-Out Management Plan has been developed, with technical and financial assistance from the United Nations Environment Programme (UNEP).

The plan seeks to limit the use of hydrochlorofluorocarbon (HCFC) supplements, reduce HCFC use in manufacturing and restrict the importation of new HCFCs. Changing the regulations relating to HCFC importation licenses and adopting importation quotas are among the first steps to be taken in implementing the plan. Myanmar is already a member of a number of other international agreements regulating the use of ODS, including the 1993 Montreal Protocol on substances that deplete the ozone layer.

Under that agreement, a number of targets have been set to cease the manufacture and use of

HCFCs by 2030. The phase-out management plan developed with the help of the UNEP is meant to assist Myanmar in fulfilling its obligations under the agreement. The government will conduct education campaigns and skills-building workshops for people who use materials that can deplete the ozone layer, such as those involved in refrigeration or air-conditioner servicing.

Source: http://www.mmtimes.com

Philippines cites firms for exemplary performance

At the joint awarding ceremony of the Philippines-Chiller Energy Efficiency Project (PCEEP) and the Philippine Environment Partnership Program (PEPP) held recently at the H_2O Hotel in Manila, the Philippines Department of Environment and Natural Resources (DENR) cited eight companies from the chiller and power sectors for exhibiting "exemplary environmental performance".

The awards went to Waterfront Cebu City Hotel and Casino/Cofely Philippines (Excellence Award); The Peninsula Manila (Excellence Award); TriNoma Malls (Plaque of Recognition); SM City Iloilo (Plaque of Recognition); Bank of the Philippine Islands-Buendia Center (Plaque of Recognition); International School Manila (Plaque of Recognition); and Manila Pavilion (Certificate of Recognition) for their initiatives in implementing energy-efficient operations.

The PCEEP is a project initiated by the World Bank-Global Environment Facility, which provides technical and financial assistance to replace their old chillers with energy-efficient and non-ODS-based chillers in order to protect the ozone layer and reduce greenhouse-gas emissions. The PCEEP provides an opportunity for chiller owners to select new chiller technologies that are not only more energy efficient, but also operating with non-ODS-based refrigerant and with lower leakage rate.

Source: http://www.businessmirror.com.ph

Indonesia to quit using hazardous coolants

As the consequence of a global agreement to end the use of powerful planet-warming substances in air-conditioners and refrigerators, Indonesia has committed to phasing out the chemicals, a tough choice for a tropical country soaked in sunshine year-round. Indonesia finally made the commitment to join nearly 200 other nations to support the movement.

The government has laid out a plan to stop acquiring new products containing hydrofluorocarbons (HFCs) by 2024. By 2050, Indonesia expects to totally phase-out HFCs. "We're asking for 2025 but according to global calculations, we have to start in 2024," said Environment and Forestry Minister Siti Nurbaya Bakar.

Siti said the government had now wholeheartedly embraced the commitment and would immediately starts preparing for the phasing out of HFCs. HFCs are described as the world's fastest-growing climate pollutant with 1,000 times the heat-trapping potency of carbon dioxide (CO_2). Indonesia mainly imports HFCs from China (73%), Europe (13%) and India (11%).

Source: http://www.thejakartapost.com

China pushes for standards

As part of the Kigali agreement to phase-down HFCs, under the Montreal Protocol, China is proposing a review of safety standards to remove barriers to alternatives to HFCs, especially natural refrigerants. During negotiations of the global agreement to phase-down HFCs recently in Kigali, Rwanda, it became apparent once again that the lack of updated standards poses a barrier to alternatives such as natural refrigerants.

A consultation group, led by China, discussed the establishment of regular consultation on safety standards, with a concrete proposal to establish an ad hoc standards coordination group. The likely reason behind this push for standards is China wants to ensure its place as a market leader in the HFC phase down. International standards would greatly assist in transportation of natural refrigerants like ammonia as well as appropriate measurements of charge sizes for hydrocarbons and pressure standards for carbon dioxide (CO_2).

The Consultation on standards requested that the Technology and Economic Assessment Panel (TEAP) establish a task force to co-ordinate with the International Electrotechnical Commission to review IEC 60335-2-40. They asked TEAP to conduct tests and risk assessments addressing; pressure, flammability and toxicity. Any review would then be forwarded to the International Organization for Standardization.

Source: http://www.hydrocarbons21.com

New refrigerant for mobile air conditioning

Developed by The Chemours Company, the United States, 'Freon™ 134a' is a non-ozone depleting HFC refrigerant replacement for R-12. It is the standard for mobile air conditioning and can also be used to retrofit existing R-12 mobile air conditioning systems. Freon™ 134a is also used in new medium- and high-temperature stationary commercial refrigeration, as well as chiller systems and home appliances. In addition, it can be used to retrofit existing R-12 refrigeration and air conditioning systems.

While HFC-134a has been the standard mobile air-conditioning refrigerant, it will not meet the EU F-gas Mobile Air Conditioning (MAC) Directive. Opteon™ YF (HFO-1234yf) is a low global warming potential (GWP) refrigerant candidate for use in mobile air-conditioning. Opteon™ YF has a GWP of 4 based on a 100-year time horizon, and will meet the EU MAC Directive. Opteon™ YF has physical properties similar to HFC-134a and, therefore, Opteon™ YF has the potential to be used in current HFC-134a systems with minimal system modifications.

Source: https://www.chemours.com

R290 outperforms HFOs

According to a recent paper from the University of Padova, Italy, propane (R290) boasts superior heat transfer potential than R32, R1234ze and a combination of R32 and R1234ze. Performing vaporisation tests on four different refrigerants, researchers found that R290 offers the biggest potential to replace the widely used R32 in several heating and cooling applications, by virtue of its heat transfer properties.

Azzolin et al, tested heat transfer performance during condensation and vaporisation of new fluorine-based refrigerants – including the hydrofluoroolefin (HFO) R1234ze and an HFC blend – compared to the hydrocarbon R290. The researchers compared these alternatives to the commonly used HFC R32, which some HVAC&R industry players are touting as an answer to the phase-down requirements of the EU's F-Gas Regulation. The research involved subjecting each fluid to vaporisation, condensation and pressure drop tests.

During vaporisation, researchers found that R32 had the highest heat transfer coefficient and the new HFC blend had the lowest heat transfer performance out of the four refrigerants. R290 came in second at the same conditions and was closely aligned with R32. "Both R32 and R290 display similar heat transfer coefficient values [….] and on average the heat transfer coefficient of R290 is 6% higher," said Azzolin et al. Propane, was the most similar to R32 and required the same amount of refrigerant charge – making it an efficient refrigerant.

Source: http://www.hydrocarbons21.com

New refrigerant cools cars

A team of scientists at Honeywell's Buffalo Research Lab, the United States, is leading the effort toward the day when heat-trapping hydrofluorocarbons (HFCs) will be as obsolete as ozone-depleting Freon in vehicle air conditioning units. The scientists developed a new refrigerant 1,300 times less potent to the environment than the HFCs in use since the 1990s. 'Solstice yf' is the trade name for the refrigerant, and it's already in more than 10 million vehicles – some 120 models made by nearly three dozen car makers.

Some of the models with the new air conditioning systems include Cadillac's XTS, several Toyota and Hyundai models, and most of the Chrysler, Jeep, Dodge and RAM brand vehicles. "We made the first gram, the first kilogram and the first ton," said Rajiv R. Singh, at the Honeywell lab. The refrigerant will be a key to implementing last week's global agreement, which calls for reducing HFCs use starting in 2019. HFCs are a fraction of what causes global warming. But scientists believe phasing them out may reduce global warming by half a degree.

Source: http://www.buffalonews.com

Low-GWP chiller with R-513A

Johnson Controls, the United States, has announced two platforms of high efficiency chillers available with low global warming potential (GWP) options. Building on its product line, Johnson Controls has extended its portfolio of YORK® chillers to include two key product families that use the refrigerant alternative R-513A – the YORK YVWA water-cooled screw chiller and the YORK YMC2 magnetic bearing water-cooled centrifugal chiller.

The offering covers a broad range from 433 to 3,516 kW (120 to 1,000 tons) for water-cooled applications. This represents

Johnson Controls' continued commitment to choose solutions that will best meet the needs of its customers and the environment based on safety, efficiency, reliability, availability and cost. "This is the first major chiller family to be offered with low-GWP alternatives. We will continue to expand our chiller portfolio with highly efficient chillers and additional low-GWP offerings," said Laura Wand, at Johnson Controls.

Additionally, Johnson Controls is leading the industry-wide discussion on the use of other low-GWP refrigerant alternatives which have an A2L (mildly flammable) safety rating. They enabled research on this topic through their donation of $100,000 to ASHRAE Research to facilitate and accelerate the safe use of flammable refrigerants. This research will help determine when and how to establish standards and building codes which address customers' flammability concerns.

Source: http://www.contractingbusiness.com

Water-cooled screw chiller

The AquaEdge 23XRV chiller from Carrier, the United States, is claimed to be the world's first integrated, variable speed, water-cooled screw chiller. It incorporates significant breakthroughs in water-cooled chiller technology to provide excellent reliability and achieve superior efficiencies at true operating conditions. And because it uses non-ozone-depleting HFC-134a refrigerant, the AquaEdge 23XRV system accomplishes it all without compromising our natural environment.

The AquaEdge 23XRV's non-ozone-depleting HFC-134a refrigerant is a chlorine-free solution that provides a safe and environmentally sound product while still providing high efficiency. HFC-134a was given an A1 safety rating by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), meaning that it is the safest refrigerant available. The decision to use HFC-134a provides customers with a long-term solution unaffected by refrigerant phase-outs.

The variable speed chiller maximizes efficiency by optimizing compressor operation. Electric power consumption drops dramatically when the motor speed slows, helping the AquaEdge 23XRV deliver industry-leading integrated part-load values in an extremely broad range of applications and climates. The quality design and construction make the AquaEdge 23XRV the best choice for modern, efficient chilled water plants – just one more example of Carrier's position as a natural leader.

Source: http://www.naturalleader.com

Hydrocarbon refrigeration

Delfield, the United States, has introduced GreenGenius™ which has been engineered to be the most energy efficient, environmentally friendly hydrocarbon based refrigeration system that they have ever developed. The new system uses R290 refrigerant, a natural hydrocarbon refrigerant that allows GreenGenius to meet and/or exceed new U.S. Department of Energy (DOE) and ENERGY STAR® 3.0 standards on most units.

Featuring Delfield's unique adaptive defrost with electronic temperature control, operators will never again have to worry about when their refrigeration system will go into defrost, since the system monitors the environment and automatically adjusts defrost times so you always have a clean, ice free evaporator, all the time. This reduces compressor cycling and saves on energy.

Natural hydrocarbon refrigerants, like R290, have many properties that are beneficial to both foodservice operators and the environment alike. Natural refrigerant gases contribute much less to global warming and don't contribute at all to ozone layer destruction. Which means GreenGenius is not only environmentally friendly but saves energy and decreases utility costs. Look for this symbol on new Delfield Coolscapes™ refrigeration products.

Source: http://www.delfield.com

International Standards in Refrigeration and Air-Conditioning

This guide provides an introduction to standards and how they can be useful in supporting the adoption of alternatives in the context of the HCFC phase-out in developing countries. It also includes an overview of existing standards related to HCFCs and their alternatives, barriers to alternatives, the process of the adoption of international and regional standards at the national level, barriers to the adoption and how to overcome them.

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Multi-purpose cleaner

D-Zolve™ 917 from Solvent Kleene Inc., the United States, is a fast acting, multi-purpose product which dissolves rust as well as removes powder coatings, liquid paint, CARC and other difficult to strip coatings. Designed for use in an immersion tank, D-Zolve is most efficient at a heated temperature of 125-130°F. D-Zolve's unique properties enable it to penetrate and break the bond between the surface layer and the underlying substrate, causing a coating to peel away or rust to be dissolved.

It quickly removes cross linked coatings, epoxy primers, polyurethane top coats, powder coatings and other tough to remove coatings from complex geometries. For objects too large for an immersion tank, a brush-on formulation is available. Designed to minimize both health and environment risks, D-Zolve is non-flammable, non-toxic and non-carcinogenic. It has a non-offensive, minimal odor, does not contain any ozone depleting components.

D-Zolve can be used on a wide range of ferrous and non-ferrous metals including: aluminum, copper, brass, stainless steel and carbon steel as well as plastic and silicone substrates. *Contact: Solvent Kleene, 119 Foster Street, Bldg. #6; Peabody, MA 01960, USA. Tel: +1-978-531-2279; Fax: +1-978-532-9304; E-mail: sales@solventkleene.com.*

Source: http://www.news.thomasnet.com

Metal cleaning solvent

Developed by EnviroTech Surface Technologies, the United Kingdom, 'DriPHOS TLT' is a new solvent based, single tank metal cleaning and pre-treatment process, which uses Thin Layer Technology (TLT) to produce consistent high quality finishes. Completely different to conventional pre-treatment processes it uses only one tank to clean, pre-treat, rinse and dry components which emerge warm to touch and with a crystalline coating on the surface which improves adhesion and protects metals against in house rusting or corrosion.

DriPHOS metal cleaning can replace current aqueous multi-tank systems reducing energy usage by at least 50%, reducing process times to 5 minute cycles, increasing throughput and uses 60% less space releasing floor area for more productive work. This new system will be familiar to users of the vapour degreasing process on which it is based but with the added benefit of surface pre-treatment in one tank. The footprint of the equipment will be the same as a vapour degreasing tank processing similar sized components.

DriPHOS TLT uses a proprietary blend of compounds in a stable low boiling point solvent carrier to dissolve the active chemicals which produce the protective crystalline structure on the metal surface. The DriPHOS TLT metal pre-treatment process cleans surfaces to a very high standard and produces a nano-thickness protective crystalline primer coating which is part of the metal surface. *Contact: EnviroTech Europe Ltd, 100a High Street, Hampton, Middlesex, UK TW12 2ST. Tel: +44-0-20-8281-6370; E-mail: contactenvirotech@envirotech-europe.com.*

Source: http://www.envirotech-europe.com

HFE-based solvent cleaner

FluoSolv™ BA developed by NuGenTec, the United States, is a proprietary blend of non- flammable hydrofluoroethers (HFEs) and trans-1,2-dichloroethylene (t-DCE) and alcohol engineered for defluxing as well as white residue removal. FluoSolv™ BA is a drop-in replacement for defluxing blends of n-propyl bromide (nPB) and similar vapor degreasing solvents.

It can also be used as a substitute for other cleaners such as Asahi AK-225 (blend of HCFC-225 ca/cb) & HCFC-141b both of which are ozone depleting substances and have been banned from production. FluoSolv™ BA solvent blending technology leverages the chemical solvency of the fluid as well as its physical properties such as high density, low surface tension and low viscosity for optimal performance.

FluoSolv™ BA is compatible with all metals, ceramic and other non-conducting materials. Most elastomeric materials are compatible except fluoroelastomers such as Viton & Kalrez which tend to swell. It is recommended that all materials be tested prior to use. FluoSolv™ BA is thermally & chemically a very stable solvent. It is non-reactive,has low water solubility and will not oxidize or degrade when exposed to air. *Contact: NuGenTec, 1155 Park Ave, Emeryville, CA 94608, USA. E-mail: fluosolv@nugentec.com.*

Source: http://www.nugentec.com

Fast-curing solutions for molded elastomers

Developed by LORD Corporation, the United States, LORD LokRelease solutions are suitable for rubber-to-metal part manufacturing

facilities, which offer semi-permanent, anti-stick surface coating for easy part removal from molded Elastomers. Presented in aerosol, aqueous and solvent-based solutions, a single application allows for multiple molding cycles, eliminating post-finishing problems. Containing no Class I or Class II ozone-depleting substances (ODS); release agents also reduce rust and corrosion in steel molds.

LORD LokRelease™ Mold Release solutions are formulated to increase time between mold-picking and to reduce mold fouling in the rubber-to-substrate molding processes. "Now commercially available, our mold releases have been used in LORD rubber-to-metal part manufacturing facilities for several years. Building on more than 90 years of experience, LORD LokRelease solutions provides a semi-permanent, anti-stick surface coating for fast, easy part removal from molds," said Chris Schneider, at LORD Corporation.

Applications for LORD LokRelease Mold Release include industrial rubber-to-substrate molding, automotive rubber-to-substrate molding and other molding processes such as injection, compression and transfer molding. *Contact: LORD Corporation, 111 Lord Drive, Cary, NC 27511, USA, E-mail: kimberly_richardson@LORD.com.*

Source: http://www.news.thomasnet.com

Alternative cleaning and degreasing agent

The BIOSANE T 218 developed by Z. I. La Massane, France, are substitutes for HCFC 141 B for cleaning and degreasing operations on sensitive materials. Use of HCFC 141 B was banned on December 31 2008 (under EC regulations) and this has led users to seek out new solutions. A number of mixes have appeared on the market – 365 MFC, 365 MFC-trans-dichloroethylene, 365 HX, and HFE. These mixes are not always capable of achieving expected results in terms of performance and they have many shortcomings in terms of safety or toxicity.

The BIOSANE T 218 have ozone depleting potential (ODP) of 0.00. These non-flammable solvents for washing, cleaning, degreasing, and decontamination départiculage improve workplace safety. The BIOSANE T 218 can replace HCFCs, HFCs, HFE solvents and chlorinated solvents or hydrocarbons. *Contact: Z. I. La Massane,13210 Saint-Rémy de Provence, France; Tel: +33-0-490-927-470; Fax: +33-0-490-923-232; E-mail: contact@mmcc.fr.*

Source: http://www.mmcc-biosane-t218.com

Grease remover

The new grease remover from Chemtex Speciality Limited, India, is a highly effective blend of stabilized vaporizing solvents for degreasing and removal of carbon, moisture, dirt and oil. Degreasers are additionally suited for the cleaning of auto motors, hardware, oil tanks and solid floors and particularly for seaward applications. CHEMTEX'S Grease Remover is a solvent based degreaser and is an excellent choice for cleaning and degreasing of various equipments and components.

It is compatible with most of the components such as seals, o-rings etc. CHEMTEX'S Degreaser effectively cleans contaminants, achieving a clean dry surface free from impurities and residue. It is completely volatile or vaporizing in nature. *Contact: Chemtex Speciality Limited, Citi Centre, Level 6, 10/11, Dr. Radha Krishnan Salai, Mylapore, Chennai - 600005, Tamil Nadu, India. Tel: +91-0-8079460779.*

Source: http://www.chemtex-speciality.com

Halogen-free solvent

Developed by Kester, the United States, 'Kester 5252' is a halogen-free solvent developed for cleaning applications. 5252 is not ozone depleting and is environmentally friendly. It is a suitable substitute for chlorinated solvents used in cleaning applications where fast air drying is critical. 5252 is most effective as a solvent to clean stencils efficiently. It also readily dissolves misprinted solder paste, wave soldered flux residues and other organic contaminants from electronic assemblies.

5252 provides rapid, effective and safe cleaning action. This cleaning solvent is a non-ionic and relatively non-toxic liquid with a mild odor. 5252 can be used as a solvent for the following applications: stencil cleaning, cleaning of misprinted assemblies, removal of post-soldering flux residues and other organic contaminants from electronic assemblies (wave-soldered and reflow processes), and general purpose cleaning.

5252 may be used at ambient temperature with ultrasonic, stencil spray equipment, or immersion agitation or manual application. When the residue has completely dissolved and is no longer visible, the residual solution is rinsed off with more solvent. The purpose is not to only dissolve the residue, but also to remove it after it is dissolved. 5252 dries fast and usually does not require any water rinse. *Contact: Kester, 800 West Thorndale Avenue, Itasca, IL, USA. Fax: +1-630-616-4044.*

Source: http://www.kester.com

Innovative fire suppression solution

3M, the United States, science-based company fuelled by innovation, showcased 3M™ Novec™ 1230 Fire Protection Fluid, at the ADIPEC held in Abu Dhabi, UAE on 7-10 November. Novec™ 1230 fluid is a revolutionary clean fire suppression agent that reduces the climate impact of a fire protection system by more than 99%. As a clean agent Novec™ 1230 fluid is electrically non-conductive and does not leave any residue when it evaporates resulting in no damage towards sensitive electronics or other valued assets.

According to a recent research report by Transparency Market Research, the global fire protection systems market for oil and gas is forecasted to reach USD 8.93 billion by the end of 2023. "Rising oil and gas exploration activities is one of the core drivers of fire protection systems in the industry," said Martin Parsons, Regional Business Leader, Electronics and Energy Business Group, 3M.

"Stringent regulations and technological advancements from across the world are also key drivers. Today's clean agent solutions should not just be environmentally sustainable, but should help protect businesses from incurring costs, potentially in the millions, that result from downtime when repairing or replacing equipment," Parsons added.

Source: http://www.scandoil.com

Portable watermist system

Surefire, the United States, has launched the first portable watermist system to achieve third-party certification to LPS 1655, BRE Global's dedicated fire performance standard for personal protection systems (PPS). Called UltraGuard the unit is a domestic fire suppression system to protect vulnerable people (elderly or disabled) from domestic fires. LPS 1655, which fills a gap in fire standards given the absence of a dedicated BS or EN standard, sets a minimum, credible performance level for PPS to instill confidence in specifiers and users.

The LPS 1655 standard incorporates system design requirements, including minimum levels of performance and functionality, system manual and installer requirements, fire test protocols and maintenance arrangements. It also covers the examination and testing of components. BRE inspectors conduct ongoing audits of manufacturer's quality management systems and production to assure units on the market conform to the design blueprint.

Products are subjected to two fire test scenarios. The first is representative of fires that start in bedding or clothing where a person may be in close proximity. The second replicates 'shielded fire development', and considers the potential for control of the fire and the prevention of fire spread beyond the items first ignited. A PPS needs to detect and suppress a fire at a very early stage before significant heat and smoke has developed to cause serious injury.

Notably, LPS 1655 requires system actuation by a fire detectors, as more traditional, thermally activated devices may be too slow, especially for smouldering fires in clothing or bedding.

Source: http://www.ifsecglobal.com

Transformer oil pool fire suppression

A team of researchers from University of Science and Technology of China conducted experiments in a 3×3×3 m room to study the transformer oil pool fire suppression by water mist. The square pool fire with dimensions of 17, 25, and 30 cm and a downward-directed single-injector nozzle with operating pressures of 1.0, 2.5, and 4 MPa were considered in the experiments. The flame shape during water mist application was recorded by a video camera.

The temperature, CO concentration, and flame thermal radiation were measured to evaluate the fire suppression process by water mist. The results show that the flame would be intensified due to the injection of water mist at the initial period, and the intensification phenomenon is related to the fire size and the injection pressure of water mist system. The flame intensification occurred obviously under low injection pressure and large-size fire conditions.

In addition, the fire extinguishment time increases with the decrease of the injection pressure and the increase of pool size. The results of this work would be valuable for optimizing the water mist system in the application of transformer substation fire suppression. The research findings have been published in *Fire Science and Technology 2015.*

Source: http://www.link.springer.com

High-pressure water mist system

The SEM-SAFE® high-pressure water mist system from Danfoss Semco, Denmark, is a unique fire fighting system. When water is forced through nozzles, at high-pressure, an extremely fine mist is formed. When the mist comes in contact with flames, it evaporates and expands minimum 1,700 times. The dense vapour created displaces the flames and quickly extinguishes the fire.

Water is supplied via a pump unit. For every ship type, the SEMSAFE® pump unit can supply all water mist applications. This is beneficial because you only need one unit for all applications, and it is easy to add more sections and applications, if needed. In addition, servicing of only one unit is easier and less costly. *Contact: Danfoss Semco A/S, Middelfartvej 9, DK-5000 Odense C, Denmark. Tel: +45-7488-7800; Fax: +45-7488-7801; E-mail: fireprotection@danfoss-semco.com.*

Source: http://www.karberg-schmitz.de

Water mist system

Hydrocore water mist systems from Hydrocore Ltd, the United Kingdom, are engineered to fight fires with finely atomised high pressure water mist. The Active Mist range of high pressure water mist systems are designed to quickly detect the fire and offer a swift and targeted response. Operating at a high pressure Hydrocore's Active Mist systems effectively suppress fire and have a quick cooling effect, ensuring the safety of people and property.

Active Mist pump units are compact modular units that can be to fit in to a small space in the kitchen or the utility room. A common pump unit can be used to supply water to nozzles fitted in all the rooms and passages in the house offering complete protection. Automatic nozzles are triggered by a heat source and only specific nozzles are activated at a given point in time. This helps in offering quick fire suppression and limiting any possible collateral damage.

With smartly engineered nozzles operating at high pressure, a very fine spray of water mist is discharged on activation. The micro droplets offer a much larger surface area to react with the heat and on contact the water mist gets instantaneously converted to steam. Less than one third amount of water is required compared to traditional suppression systems and hence most of the Active Mist systems can be connected directly to the main water supply and do not require a water tank.

Source: http://www.hydrocore.co.uk

Multi-additive suppressant agent

A team of researchers from State Key Laboratory of Disaster Prevention & Reduction for Power Grid Transmission and Distribution Equipment, Hunan Electric Power Corporation Disaster Prevention and Reduction Center, State Grid Key Laboratory of Power Transmission and Distribution Equipment Anti-icing & Reducing-disaster Technology, China, have proposed a new low-flow and high-lift firefighting approach for the application of wildfire near transmission lines.

To solve the challenges, the researchers developed a comprehensive firefighting equipment set which consisted of a high-effective suppressant agent with properties to prevent reignition and a mobile firefighting platform with long-distance and high-lift features. The liquid suppression agent improved the effectiveness of fire suppression while reducing the consumption of water significantly.

As the hydraulic flow was decreased for a given volume of water, the hydraulic pressure was increased. In this way, the platform can produce a hydraulic pressure over 120 bar for an effective lift of 500 m. The results of field experiments demonstrated that the proposed approach is able to control wildfires over a long distance and high lift, which proved the effectiveness of the approach.

Source: http://www.jfs.sagepub.com

Comparison between sprinkler and water-mist systems

Recent efforts to investigate car-park fires and understand the related mechanisms have fostered the need for analyses of suppression performance against this type of fire scenario. In a recent study, a team of researchers from the University of Modena and Reggio Emilia, Italy, provided an insight into the ability of sprinklers and water-mist systems to control and extinguish a fire within an enclosed car park through a series of real-scale experiments. Three cars were employed in each test: the central one was ignited by a heptane pool fire and the adjacent ones served as targets. Two configurations were explored: in the first one, a nozzle was placed directly at the vertical axis of the ignition source, whereas the ignition source was located between the area coverage of four nozzles in the second one.

The sprinkler system mainly served as a reference; two values of discharge density were evaluated for water mist at high operative pressure and a biodegradable surfactant was also tested against the most challenging configuration. A quantitative analysis of free-burn and discharge phases by temperature measurements was coupled with radiant heat-flux measurements and an assessment of post-fire damage. Sprinkler and water-mist systems were capable of containing the fire spread and thermally controlling the fire, thus preventing structural damage.

Source: https://www.researchgate.net

Liquid blowing agent

Honeywell, the United States, has announced that one of its low global warming potential (GWP) materials is being incorporated into a new solution for producing foam used in applications ranging from office furniture armrests to padded cushions for rollercoasters. Honeywell's low GWP Solstice® Liquid Blowing Agent (LBA) is being used in new foam systems developed by The Dow Chemical Company, the United States, to make integral skin (I-Skin) foam.

Blowing agents are critical for foam systems because they cause the foam to expand properly, significantly impact the foam's performance, and make it easier to manufacture. Solstice LBA was developed as an ultra-low GWP replacement for a range of hydrofluorocarbon, or HFC, blowing agents that are being phased out by the U.S. Environmental Protection Agency (EPA) to reduce the use of high GWP materials. Use of HFC blowing agents in I-Skin polyurethane foam applications will be banned in the U.S. beginning Jan. 1, 2017.

I-Skin foam is composed of a two-part polyurethane system: a flexible, lightweight foam core encased in a thick outer "skin" that is created in a single molding process. Tests of Dow's new polyurethane solutions, VORALUX™ for furniture and SPECFLEX™ for custom molding, demonstrated superior results for a variety of Shore A hardness levels, a critical quality measure.

Source: http://www.foam-expo.com

Polypropylene/starch blend foams

A team of researchers from Chinese Academy of Sciences (CAS) presented a facile approach to prepare open-cell polypropylene (PP)/starch blend foams with low density by twin-screw extrusion using water as a physical blowing agent and starch as an effective water carrier. The cell diameter of the prepared PP/starch blend foams was controlled by using different nucleating agents and changing the die geometry.

Foams with mean cell diameter in the range of 0.4-4.5 mm and open-cell content larger than 90% were successfully obtained. Moreover, a remarkable improvement of hydrophobicity of the foams was obtained when decreasing the cell diameters. Consequently, the water contact angle and oil recovery efficiency were increased up to 142.2° and 98.4%, respectively, when the mean cell diameter was reduced to 0.4 mm. These characteristics make this foam a promising candidate absorbent material for use in oil-spill cleanup.

Source: http://www.pubs.rsc.org

Microcellular foam using physical blowing agents

A team of researchers from Hitachi Maxell Ltd, Japan Steel Works Ltd and Kyoto University, Japan, has developed a new foam injection-molding technology to produce microcellular foams without using supercritical fluid (SCF) pump units. In this technology, physical blowing agents (PBA), such as nitrogen (N_2) and carbon dioxide (CO_2), do not need to be brought to their SCF state.

PBAs are delivered directly from their gas cylinders into the molten polymer through an injector valve, which can be controlled by a specially designed screw configuration and operation sequence. The excess PBA is discharged from the molten polymer through a venting vessel. Alternatively, additional PBA is introduced through the venting vessel when the polymer is not saturated with PBA.

The amount of gas delivered into the molten polymer is controlled by the gas dosing time of the injector valve, the secondary reducing pressure of the gas cylinder and the outlet pressure of the venting vessel. Microcellular polypropylene foams were prepared using the developed foam injection-molding technology with 2-6 MPa CO_2 or 2-8 MPa N_2.

Source: http://www.onlinelibrary.wiley.com

Low density nanocellular polymers

Researchers from Universidad de Valladolid, Spain, in a paper has described the processing conditions needed to produce low density nanocellular polymers based on polymethylmethacrylate (PMMA) with relative densities between 0.45 and 0.25, cell sizes between 200 and 250 nm and cell densities higher than 1014 cells/cm3. To produce these nanocellular polymers, the foaming parameters of the gas dissolution foaming technique using carbon dioxide (CO_2) as blowing agent have been optimized.

Taking into account previous works, the amount of CO_2 uptake was maintained constant (31% by weight) for all the materials. Foaming parameters were modified between 40 °C and 110 °C for the foaming temperature and from 1 to 5 min for the foaming time.

Source: http://www.mdpi.com

Bacteria offers means of controlling crop pest

Researchers at Oregon State University (OSU), the United States, have discovered a bacterium common in insects found in a plant-parasitic roundworm, opening up the possibility of a new, environmentally friendly way of controlling the crop-damaging pest. The worm, 'Pratylenchus penetrans', is one of the 'lesion nematodes' – microscopic animals that deploy their mouths like syringes to extract nutrients from the roots of plants, damaging them in the process.

This particular nematode uses more than 150 species as hosts, including mint, raspberry, lily and potato. The newly discovered bacterium is a strain in the genus Wolbachia, one of the world's most widespread endosymbionts - organisms that live within other organisms. Wolbachia is present in roughly 60 percent of the globe's arthropods, among them insects, spiders and crustaceans, and also lives in nematodes that cause illness in humans.

Depending on the host species, Wolbachia can be an obligate mutualist – the bacteria and the host needs each other for survival – or a reproductive parasite that manipulates the host's reproductive outcomes in ways that harm the host and benefit the bacteria. In the case of the crop-pest nematode, Pratylenchus penetrans, the bacteria-host relationship appears to not be one of obligate mutualism – many examples of non-infected worms have been found, meaning the worm doesn't rely on Wolbachia to survive.

Source: http://www.phys.org

Postharvest vegetable treatment

Scientists from Plant & Food Research, New Zealand, have been trialing a specially engineered high-pressure washing machine for taro to help reduce the risk of pests entering the country. Taro is a particularly difficult vegetable to clean as it is covered in fibrous leaf and root matter and its pitted nature can mean soil residues. The high-pressure washing machine has been tested along with hot water treatments for its ability to eliminate this material and remove or kill microscopic organisms.

The machine, which was designed and built by engineers at Plant & Food Research's Ruakura site, forms part of a larger biosecurity project by the Ministry for Primary Industries (MPI) to reduce the use of the fumigant methyl bromide, an ozone depleting gas which can damage the vegetable and affect storage quality and shelf life. "This has necessitated finding new applications in pest management which meet border control requirements while not compromising the quality of the product," said Dr Allan Woolf, at Plant & Food Research.

Another key goal of the trial is to ensure that organic matter and unwanted organisms are removed without damaging the product itself. Although detailed post-trail data still need to be collected, initial results are said to be positive. The machine follows a similar design to those manufactured to clean apples and citrus fruit, but with a modified brush bed and high-pressure nozzles which target the taro corms at specific angles as they sit between the rollers.

Source: http://www.freshfruitportal.com

Bioreactor removes gaseous methyl bromide

Scientists at the U.S. Geological Survey (USGS) have developed and patented a bioreactor to remove gaseous methyl bromide from the exhaust that results from the fumigation of shipping containers. The system makes use of specialized bacteria for efficient removal of the contaminants. Seaports all along the coasts receive thousands of shipping containers each day that are routinely fumigated with methyl bromide to prevent non-native insects and other unwanted organisms from invading the country.

The downside of this practice is that the methyl bromide (bromomethane) exhausted to the atmosphere from fumigation operations has a negative impact on the Earth's ozone layer. In addition, methyl bromide is hazardous to human health. USGS scientists Larry Miller, Ron Oremland, and Shaun Baesman have received a patent (patent number 6,916,446) for a bioreactor that removes methyl bromide from the exhaust from fumigation operations.

The bioreactor contains a culture of specialized microorganisms (methylotrophic bacteria) that removes methyl bromide from the exhaust by oxidizing it to carbon dioxide, hydrobromic acid, and water. A 1,000-liter bioreactor is capable of removing 10 kilograms (kg) of methyl bromide in 50 hours. The development of the bioreactor is a practical application of the extensive research by these scientists on microorganisms in the natural environment that degrade methyl bromide and other methyl halides.

Source: http://www.toxics.usgs.gov

Debromination of methyl bromide

A team of researchers from Stanford University, San Joaquin Valley Agricultural Sciences Center, University of California, the United States, have described a system in which CH_3Br fumes vented from fumigation chambers could be captured by granular activated carbon (GAC). The GAC was converted to a cathode by submergence in a high ionic strength solution and connection to the electrical grid, resulting in reductive debromination of the sorbed CH_3Br.

The GAC bed was drained and dried for reuse to capture and destroy CH_3Br fumes from the next fumigation. However, the loose GAC particles and slow kinetics of this primitive electrode necessitated improvements. Here, we report the development of a cathode containing a thin layer of small GAC particles coating carbon cloth as a current distributor.

Combining the high sorption potential of GAC for CH_3Br with the conductivity of the carbon cloth current distributor, the cathode significantly lowered the total cell resistance and achieved 96% reductive debromination of CH_3Br sorbed at 30% by weight to the GAC within 15 h at −1 V applied potential vs standard hydrogen electrode, a time scale and efficiency suitable for postharvest fumigations.

Source: http://www.pubs.acs.org

Non–brassicaceous biofumigants

In a recent study conducted by the College of Agriculture, University of Southern Mindanao, Philippines, researchers evaluated the potential of nonbrassicaceous plants as biofumigants against S. rolfsii causing stem and root rot (SRR) of coffee seedlings; determine which of the test treatments would be most effective in managing the target disease; and, determine the cost efficacy of treatments usage for a thousand coffee seedlings as eradicative treatments against S. rolfsii causing SRR of coffee seedlings.

All non–brassicaceous biofumigants significantly reduced population density of S. rolfsii two months after biofumigation. Four (4) test biofumigants (Marigold, Mayana, Tsitsirika plants and Moringa leaves) treated plants exhibited longer days to symptom appearance of SRR in coffee seedlings comparable to Rose Balsam (nonbrassicaceous) and Cabbage Wastes (brassicaceous check) treated plants.

Application of nonbrassicaceous test biofumigants significantly reduced the percentage infection (PI) and severity infection(%DI) of SRR on Robusta coffee seedlings caused by S. rolfsii after two months of biofumigation comparable to RB (nonbrassicaceous check) and CWs (brassicaceous check). The inoculated/untreated control had the highest PI and %DI with respective means of 92.50 and 84.

Source: http://www.usm.edu.ph

Zeolite formulations as alternative fumigant

A team of researchers from Karadeniz Technical University, Turkey Marmara Research Center Food Institute and Ankara University, Turkey, evaluated the insecticidal efficacy of two entomopathogenic fungi, Trichoderma asperellum and Beauveria bassiana to control of Tribolium confusum alone or in combination with de novo zeolite formulations.

The bioassays were conducted at 20°C, 25°C, and 30°C temperatures and 55% relative humidity on stored wheat. Single characters contain of each fungus or zeolite formulation (Zeolite 4A-Ph8, Zeolite 800MSC, ECOZEO Project®) were applied at 400 ppm dosage rate alone, aside from binary combinations (FMC-008=T. asperellum+Zeolite 4A-Ph8; FMC- 009=B.bassiana+Zeolite 4A-Ph8, 6x109 UFC/gr).

Mortality was measured after 7, 14, 21, and 28 d of exposure. F1 progeny was recorded after 8 weeks. The mean mortality of T. confusum adults after 21 d of exposure considering all single and binary combinations were less than 50% , 80%, and 80% at the 20°C, 25°C, and 30°C temperatures respectively.

Source: https://www.mbao.org

Fumigation for control of quarantine pests

A team of researchers from the Agricultural Research service (ARS), the U.S. Department of Agriculture (USDA) investigated the impact of nitric oxide fumigation on the quality of several fresh commodities and the efficacy on a flat mite Brevipalpus yothersi. With 1% (v:v) nitric oxide fumigated for 6 hours at 5 °C chamber temperature and the fumigations terminated with nitrogen flush to reduce remaining nitric oxide in the chambers.

At the end of fumigation, there was no adverse impact was found to the following fruit and vegetable tested: asparagus, avocado, grape, mango, navel orange, and kiwi. However, the above same fumigation conditions completely killed the adults mites of B. yothersi. In fact, shorter fumigation period (4 hours) and lower nitric oxide rate (0.5% v:v) also achieved 100% kill of the mite.

Source: https://www.mbao.org

RECENT PUBLICATIONS

Practical Guide to Water-Blown Cellular Polymers

This book discusses the latest trends in the cellular industry and the use of water as a non-pollutant blowing agent for cellular polymers. It is a comprehensive presentation of all aspects of the technology required to produce water-blown cellular foams with different polymers to meet market demands. This book provides theoretical and practical information as well as guidance, and is an ideal source of information for libraries, students, teachers, foam producers and entrepreneurs.

Contact: Publications Sales, Smithers Rapra, Shawbury, Shrewsbury, Shropshire, SY4 4NR, UK. Tel: +44-0-1939-250383; Fax: +44-0-1939-251118; E-mail: PSales@smithers.com

Polymeric Foams: Innovations in Processes, Technologies, and Products

This book captures the most dynamic advances in processes, technologies, and products related to the polymeric foam market. It also discusses novel processes, new and environmentally friendly blowing agents, and the development and usage of various types of foams, including bead and polycarbonate, polypropylene, polyetherimide microcellular, and nanocellular.

Contact: CRC Press. Tel: +44-0-1235-400-524; Fax: +44-0-1235-400-525 E-mail: tandf@bookpoint.co.uk

National Hydrofluorocarbon (HFC) Inventories

The Climate and Clean Air Coalition (CCAC) is supporting the development of national HFC inventories to help countries better understand the present situation and inform decision-making about policies and technologies to replace or avoid HFCs. This booklet presents a summary of the key findings from the first tranche of inventories completed to date – Bangladesh, Chile, Colombia, Ghana, Indonesia and Nigeria – plus initial draft findings from other countries whose inventories are still under way.

Contact: OzonAction, UN Environment Economy Division 1, rue Miollis, Building VII 75015 Paris, France. Tel: +33-1-4437-1450, Fax: +33-1-4437-1474p; E-mail: ozonaction@unep.org

TECH EVENTS

2017

23-25 Feb
Greater Noida, Delhi

ACREX India 2017
Contact: ISHRAE, K-43 (Basement)
Kailash Colony
New Delhi-110048, India
Tel: +91-11-4163-5655
E-mail: coordinator@acrex.in
Web: http://www.acrex.in

12-14 Apr
Beijing, China

China Refrigeration Expo 2017
Contact: Beijing International Exhibition Center of CCPIT-Beijing
Beijing, China
Tel: +86-10-5856-5888
Fax: +86-10-5856-6000

15-18 May
Rotterdam, The Netherlands

12th Heat Pump Conference
Contact: Conference Secretariat
Congress, P.O. Box 77
3480 DB Harmelen
Tel: +31-88-089-8101
E-mail: heatpump@congressbydesign.com
Web: http://www.hpc2017.org

13-15 Jun
Ho chi Minh, Viet Nam

RAHB Viet Nam 2017
Contact: Top Repute Co., Ltd.
Unit 2802, Shun Tak Centre West Tower
168-200, Connaught Road
Central Hong Kong
Hong Kong
Tel: +852-2851-8603
Fax: +852-2851-637

6 Sep
Bangkok, Thailand

ATMOsphere Asia 2017
Contact: ATMOsphere
Tel: +32-2-230-37-00
E-mail: info@ATMO.org
Web: http://www.atmo.org

20-21 Sep
Rome, Italy

The 17th International Water Mist Conference
Contact: International Water Mist Association
Poststraße 33 (im HBC)
20354 Hamburg, Germany
Tel: + 49-0-40-3508-5215
Fax: + 49-0-40-3508-580
E-mail: info@iwma.net
Web: http://www.iwma.net

13-15 Nov
San Diego, USA

Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions 2017
Contact: Conference Secretariat
E-mail: mbao_admin@mbao.org

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