VATIS UPDATE

Ozone Layer Protection

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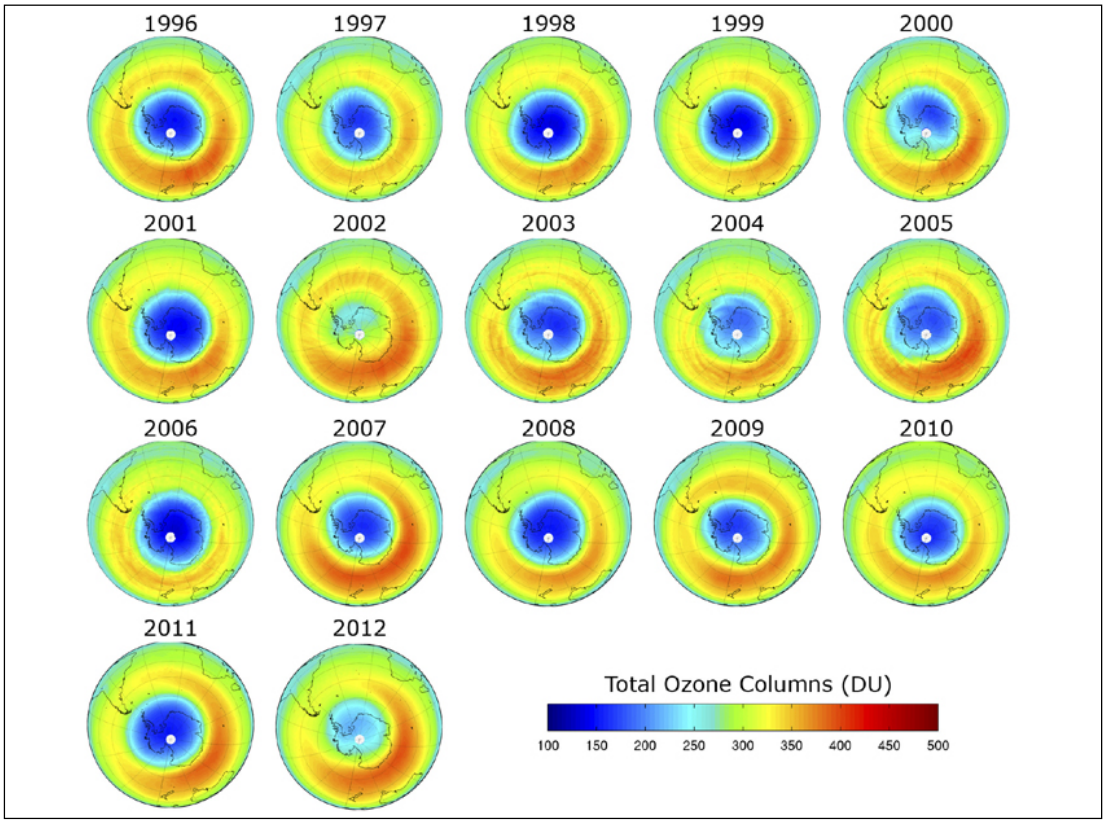
Apprise yourself with the latest technological innovations

Highlights

- Gas that triggers ozone damage found
- Cooling system uses lasers instead of refrigerants
- Eliminating GHGs from PCB production
- Powder aerosol fire extinguishing systems
- Enhancing oil recovery with carbon dioxide foam
- Multi-fumigant scrubbing system



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

Time-series (1996 to 2012) of total polar ozone mean values during September, October and November as measured by GOME, SCIAMACHY and GOME-2 flown on ERS-2, Envisat and MetOp-A. Smaller ozone holes are evident during 2002 and 2012 (see page 4).

(Credit: Belgian Institute for Space Aeronomy, Belgium)

VATIS* Update
Ozone Layer Protection
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Ozone layer on the road to recovery?

Satellites have shown that the recent ozone hole over Antarctica was the smallest seen in the past decade. Long-term observations also reveal that the Earth's ozone has been strengthening following international agreements to protect this vital layer of the atmosphere. According to the ozone sensor on Europe's MetOp weather satellite, the hole over Antarctica in 2012 was the smallest in the last decade. This instrument continues the long-term monitoring of atmospheric ozone started by its predecessors on the ERS-2 and Envisat satellites.

Ozone depletion is more extreme in Antarctica than at the North Pole because high wind speeds cause a fast-rotating vortex of cold air, leading to extremely low temperatures. In these conditions, human-made chlorofluorocarbons (CFCs) have a strong depleting effect on the ozone, creating the infamous hole. Over the Arctic, the effect is far less pronounced because the northern hemisphere's irregular land masses and mountains normally prevent the build-up of strong circumpolar winds. Although ozone layer has been observed for several decades with multiple instruments, combining the existing observations from many different sensors to produce consistent and homogeneous data suitable for scientific analysis is a difficult task. Within the Climate Change Initiative of the European Space Agency (ESA), harmonized ozone climate data records are generated to document the variability of ozone changes better at different scales in space and time. With this data, scientists can better estimate the timing of the ozone layer recovery, and in particular the closure of the ozone hole. Chemistry climate models show that the ozone layer may be building up, and the hole above Antarctica will close in the next few decades.

Source: phys.org

The enduring effects of ozone depletion

One of the most sobering realities of climate change is that even if all greenhouse gas (GHG) emissions came to an abrupt halt tomorrow, climbing temperatures, rising seas and extreme weather would still be in the global forecast for perhaps hundreds of years because of the carbon dioxide (CO_2) already released into the atmosphere. The ozone hole over Antarctica illustrates how even a relatively small perturbation in the atmosphere can have long-lasting and wide-reaching consequences. In spite of international action being taken within two years of the discovery of the patch of thinning ozone in 1985 to put an end to the release of ozone depleting chlorofluorocarbons (CFCs), scientists are still discovering the rippling effects of CFC pollution decades later.

Two recent papers highlight how the hole in the ozone layer, which is beginning to recover because of limits imposed on CFCs, is influencing major wind patterns, ocean circulation, carbon concentrations in the atmosphere and even rain fall in the Amazon. Evidence indicates that, more than GHG emissions, the ozone layer depletion is contributing to the movement of the southern jet stream towards the South Pole, say Prof. Sukyoung Lee and Prof. Steven Feldstein, from Penn State University in the United States. Together with other effects, this leads to unusual rain fall patterns in the subtropics. Just how the ozone hole causes a shift in the southern jet stream is not well understood. Generally speaking, however, ozone absorbs ultraviolet (UV) radiation and therefore warms the atmosphere. A decline in ozone therefore leads to less absorption and less heating, cooling the polar lower stratosphere. This has an impact on the winds in the troposphere.

The paper presented by Dr. Darryn Waugh and colleagues from Johns Hopkins University in the United States, shows that the ozone hole and its effects on wind patterns are in turn amplifying ocean currents that move surface water from the pole deeper into the ocean. As the water moves towards the Equator, it brings water from deep in the ocean up to the surface at the pole. Dr. Waugh tracked concentrations of CFC-12 to find out how recently water had been at the ocean's surface. "The water from deep in the ocean may not have seen the surface for hundreds of years," says Dr. Waugh. "This 'old' water is very carbon-rich, from dead organic matter that sinks to the bottom of the ocean." When such water is pulled to the surface, the ocean in this area absorbs less carbon. Around 40 per cent of the absorption of carbon into the ocean has been thought to occur at the southern latitudes, noted Dr. Waugh.

Source: green.blogs.nytimes.com

Gas that triggers ozone damage found

In the United Kingdom, scientists at the Universities of Leeds and York have found that the majority of the ozone depleting iodine oxide found over the remote ocean comes from a marine source not known previously. The researchers discovered that the principal source of iodine oxide can be explained by emissions of hypoiodous acid (HOI) –

a gas not yet considered as being released from the ocean – together with a contribution from molecular iodine (I_2). When methyl iodide was found to be ubiquitous in the ocean, the presence of iodine in the atmosphere was thought to arise mainly from emissions of organic compounds from phytoplankton, the microscopic marine plants.

The new research builds upon an earlier study that had shown reactive iodine, along with bromine, in the atmosphere to be responsible for the destruction of large amounts of ozone – around 50 per cent more than predicted by the most advanced climate models – in the lower atmosphere over the tropical Atlantic Ocean. The scientists quantified gaseous emissions of inorganic iodine following the reaction of iodide with ozone in a series of laboratory experiments. They showed that the reaction of iodide with ozone leads to the formation of both molecular iodine and hypoiodous acid. Using laboratory models, the team showed that the reaction of ozone with iodide on the sea surface could account for around 75 per cent of observed iodine oxide levels over the tropical Atlantic Ocean. Prof. John Plane, from School of Chemistry, University of Leeds, states: "This mechanism of iodine release into the atmosphere appears to be particularly important over tropical oceans, where measurements show that there is more iodide in sea water available to react with ozone. The rate of the process also appears to be faster in warmer water. The negative feedback for ozone should therefore be particularly important for removing ozone in the outflows of pollution from major cities in the coastal tropics."

Prof. Lucy Carpenter, Department of Chemistry at University of York, states: "Our research reveals an important negative feedback for ozone – a sort of self-destruct mechanism. The more ozone there is, the more gaseous halogens are created which destroy it." The research also has implications for the way that the radionucleides of iodine in sea water, released into the ocean from nuclear reprocessing facilities, can be re-emitted into the atmosphere. *Contact: Prof. John Plane, Professor of Atmospheric Chemistry, School of Chemistry, University of Leeds, Leeds, LS2 9JT, United Kingdom. Tel: +44 (113) 343 8044; Fax: +44 (113) 343 6565; E-mail: j.m.c.plane @leeds.ac.uk.*

Source: www.leeds.ac.uk

Vetlesen Prize for climate scientists' work on ozone hole

Ms. Susan Solomon, an atmospheric chemist in the United States who led the work to identify the cause of the Antarctic ozone hole, and Mr. Jean Jouzel, a French geochemist who extracted the longest-yet climate record from polar ice cores have jointly won the prestigious 2012 Vetlesen Prize, the US$250,000 award considered to be the Earth sciences' equivalent of a Nobel.

Ms. Solomon's work in identifying the cause of Antarctica's springtime ozone loss helped bring about global restrictions on human-made ozone depleting chemicals. Working at the United States' National Oceanic and Atmospheric Administration (NOAA), she proposed in a 1986 study that refrigerants and other industrial chemicals were responsible for the Antarctic ozone hole discovered a year earlier. Ms. Solomon led two expeditions to Antarctica in 1986 and 1987, bringing back key measurements that proved her hypothesis. Recognizing that ozone protects the planet from harmful ultraviolet rays, policymakers around the world responded with rare speed. In 1987, they agreed on the Montreal Protocol to phase out the use of ozone-depleting chemicals such as chlorofluorocarbons (CFCs).

Mr. Jouzel has been involved in collecting ice-core records from both poles since the 1970s and has advanced isotopic techniques for extracting past climate information from them. In the longest climate reconstruction yet from ice cores, Mr. Jouzel in a 2007 study charted temperatures in Antarctica for the past 800,000 years, over eight consecutive ice ages. The record was enough to highlight Antarctica's climate response to slowly varying seasonal distribution of sunlight caused by changes in the Earth's orbit. It was also detailed enough to reveal climate variations within each ice age cycle due to the Earth's complex internal climate system. Mr. Jouzel has also been a leader in bringing human-caused climate change to the public's attention. For the past 20 years, he has worked on the Intergovernmental Panel on Climate Change (IPCC), a scientific intergovernmental body, and is at present the Vice President of the climate science working panel.

The Vetlesen Prize, established in 1959, is given "for scientific achievement resulting in a clearer understanding of the Earth, its history or its relations to the universe". The prize is funded by the G. Unger Vetlesen Foundation in New York, the United States, and administered by the Columbia University's Lamont-Doherty Earth Observatory in the United States. It is designed to recognize sweeping achievements on par with the Nobel, and is given every several years.

Source: phys.org

HPMP Stage-I launch and stakeholders' workshop

A Stakeholders' Workshop was organized on 20 February 2013 at India Habitat Centre, New Delhi, India, with Mr. R.R. Rashmi, Joint Secretary, Ministry of Environment and Forests (MoEF), as the Chief Guest. Dr. A. Duraisamy, Director, Ozone Cell, MoEF, welcomed the guests, representatives of UNDP and UNEP (implementing agencies) and GIZ (bilateral agency), line ministries and participants to the workshop. Mr. Nandan Chirmulay, Regional Coordinator, Asia-Pacific, Montreal Protocol Unit/Chemicals, UNDP, delivered the address on behalf of UNDP as the agency for implementation of Hydrochlorofluorocarbon (HCFC) Phase-out Management Plan (HPMP) Stage-I in the country.

Mr. Rashmi launched the HPMP Stage-I and delivered the inaugural address. He lauded the efforts and contributions made by the implementing agencies, stakeholders (especially industry) and industry associations in the preparation of HPMP Stage-I. He noted that India is one of the large consumers of HCFCs but has only 5 per cent of the global consumption. He emphasized that there is a need for further involvement of industry for evolving better and environment-friendly technologies. A number of presentations on key features of India's HPMP Stage-I, progress in implementation and planning and the industry's perspective on the country's HPMP Stage-I were also made during the workshop. An interactive session was held to discuss the implementation modalities of polyurethane foam sector plan under the HPMP Stage-I.

Source: www.ozonecell.com

Policy decision to comply with HPMP Stage-I targets

The 19th Meeting of the Parties (MOP) to the Montreal Protocol held in September 2007 accelerated the phase-out of Group VI substances (hydrochlorofluorocarbons, HCFCs) in India, with the following schedule:

- Base level for production and consumption set to the average of 2009 and 2010;
- Freeze in 2013 at the base level;
- 10 per cent reduction in 2015;
- 35 per cent reduction in 2020;
- 67.5 per cent reduction in 2025; and
- 100 per cent reduction in 2030 with a service tail of 2.5 per cent annual average during the period 2030-2040.

The HCFC Phase-out Management Plan (HPMP) Stage-I is being implemented to meet the 2013 freeze and 2015 phase-out targets as per the above schedule. To comply with HPMP Stage-I, the following steps have been adopted with immediate effect:

- Introduction of quota system for the production and consumption of Group VI substances for non-feedstock applications;
- Monitoring and reporting system for all feedstock applications including use of carbon tetrachloride;
- Prohibition of issuance of licence for import of blends that contain ozone depleting substance (ODS), including Group VI substances;
- Ban on creating new capacities to manufacture products made with or containing Group VI substances; and
- Prohibition of issuance of licence for import of pre-blended polyols containing Group VI substances.

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Source: www.ozonecell.com

Workshop for RAC technicians on good service practices

The Ozone Cell, Ministry of Environment and Forests (MoEF), GIZ, India, and the Compliance Assistance Programme (CAP) of the United Nations Environment Programme – Regional Office for Asia and the Pacific (UNEP-ROAP) organized in Mumbai a workshop on India's HCFC Phase-out Management Plan (HPMP) for the refrigeration and air-conditioning (RAC) servicing sector, particularly distributors of spare parts and refrigerants and technicians' associations.

The workshop highlighted not only the benefits of good practices to the environment but also the advantages for the business in terms of reduced energy costs and for the health and safety of technicians. One of the key recommendations of the workshop was the formation of a RAC technicians' association in Mumbai. The plan of action will be further developed with the support and inputs of the experience of the Indian Society of Heating, Refrigerating and Air-conditioning Engineers (ISHARE) and Maharashtra RAC Technicians' Association. *Contact: Mr. Atul Bagai, Senior Regional Network Coordinator, OzonAction Programme, UNEP Regional Office for Asia and Pacific, Thailand. Tel: +66 (2) 2881 662; Fax: +66 (2) 2883 041; E-mail: atul.bagai@unep.org.*

Source: www.unep.org

Enforcement training in Pacific Islands peaks

The Pacific Island Countries (PICs) are in full speed in the national delivery of the training programme for customs and other enforcement officers on monitoring and control of ozone depleting substance (ODS) under the Montreal Protocol. When it comes to major environmental concerns like ozone layer depletion and climate change, the contribution of PICs is not as large as other nations, though the negative effects to these countries are very severe. The PICs have shown potential in taking a leadership role in the Montreal Protocol's implementation through timely and effective adoption of their Hydrochlorofluorocarbon (HCFC) Phase-out Management Plans (HPMPs), particularly the capacity-building programmes on enforcement and the refrigeration servicing sector, according to Mr. Atul Bagai, Senior Regional Coordinator, OzonAction, United Nations Environment Programme – Regional Office for Asia and the Pacific (UNEP-ROAP).

Article 5 countries like the PICs must freeze imports of HCFCs to their baseline consumption (2009-2010 average) in the beginning of 2013. The Montreal Protocol enforcement training workshops in the PICs are managed by government national ozone officers, with the support of UNEP-ROAP's Compliance Assistance Programme and the Oceania Customs Organization (OCO) Secretariat. Funding assistance is from the Montreal Protocol Multilateral Fund (MLF) under the approved HPMP for the Pacific region. The regional HPMP covers 12 PICs: Cook Islands, Federated State of Micronesia, Kiribati, Marshall Islands, Nauru, Niue, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. One major component of the HPMP is institutional and human resource capacity building of enforcement officers relating to trade controls and monitoring of HCFCs and other ODS.

Based on the data of the Ozone Secretariat, HCFCs are the major ODS imported in the PICs. The other ODS imported is methyl bromide used in plant quarantine and pre-shipment fumigation. In the latter half of 2012, a series of training workshops were held in Tonga, Solomon Islands, Vanuatu, Marshall Islands, Palau and Samoa. Similar capacity-building workshops will be conducted in Kiribati and Tuvalu in 2013. The workshops – attended by customs, quarantine, environment, fire and other enforcement officials – succeeded in enhancing their capacities in effective control, monitoring and regulation of ODS trade and in achieving compliance with the Montreal Protocol. Key stakeholders such as shipping agents, customs brokers and the private sector were also invited. The training also aimed to provide a platform to strengthen cooperation among law enforcement agencies in responding to issues relating to ODS trade and control. *Contact: Ms. Artie Dubrie, Regional Network Coordinator, Compliance Assistance Programme (CAP), OzonAction Branch, UNEP Regional Office for Asia and the Pacific, Bangkok, Thailand. Tel: +66 (2) 2882 128; E-mail: dubrie@un.org.*

Source: www.unep.org

New partnership to reduce methyl bromide emissions

The FAO-based International Plant Protection Convention (IPPC) and the United Nations Environment Programme (UNEP) have agreed to join forces to help countries to better manage their handling of the ozone-damaging gas methyl bromide (MeBr), used to treat plant products, and thereby prevent the accidental spread of pests and diseases. In a new Memorandum of Understanding (MOU) signed by the two parties, IPPC and UNEP's Ozone Secretariat committed to working closely together to promote wider implementation of existing recommendations regarding MeBr as well as to support efforts to develop alternative phytosanitary treatments to replace it, where possible. The Montreal Protocol discourages the use of MeBr to combat pests and disease for non-quarantine purposes during production, but does make an exception for its utilization as a phytosanitary quarantine treatment, given its effectiveness in stopping pests and diseases.

Where alternatives to MeBr use during quarantine do not exist or are not feasible, a recommendation by the Commission on Phytosanitary Measures (CPM) of IPPC encourages best fumigation practices that can limit unwanted emissions of the gas and calls for a shift away from MeBr as much as possible through the development of new alternative treatments. For that to happen, plant protection authorities need information on and access to alternative treatments that are affordable, effective and appropriate to their specific needs. The recent MOU is intended to support these goals by:

- Strengthening information gathering on how MeBr is being used currently for quarantine purposes in order to identify opportunities for shifting to alternative measures;
- Improving regional and international coordination regarding MeBr management;
- Fostering information exchanges and co-operative research aimed

at reducing emissions of the gas and developing alternative phytosanitary treatments; and

- Promoting best fumigation practices in order to minimize MeBr emissions and encourage wider use of MeBr recovery and recycling technologies.

Source: www.fao.org

Exhibition highlights importance of ozone layer

The Pakistan Museum of Natural History (PMNH) organized an art exhibition and prize distribution ceremony on 14 December 2012 in which students drew sketches on the topic of 'Ozone is our Friend'. The event was arranged to celebrate 25 years of the Montreal Protocol. PMNH organized the event in collaboration with the Ozone Cell of the Ministry of Climate Change, and Funkor, an Islamabad-based NGO. Mr. Asif, Ozone Cell Manager, and Ms. Fauzia Minallah, Funkor Director, were present at the event. Mr. Muhammad Akhter Javed, Senior PMNH Operational Manager was the Chief Guest. The art competition was organized by Funkor for students hailing from schools in remote areas to create awareness about the ozone layer's rapid depletion and its causes. Mr. Asif spoke on the concept of ozone layer and threats to it. Mr. Javed inaugurated the exhibition, and distributed prizes and shields among participants of the competition.

Source: www.dailytimes.com.pk

China announces ODS list subject to import and export

The sixth batch of ozone depleting substances (ODSs) subject to import and export control in China was released on the website of the Ministry of Environmental Protection (MEP) on 31 December 2012. This list has been formulated to support the implementation of the 1999 Measures on the Import and Export Control of Ozone Depleting Substances for the purpose of fulfilling China's international obligations to protect the ozone layer. The sixth batch contains a single kind of ozone depleting chemicals – other methane, ethane and propane only with bromine (Br) and fluorine (Fl), with the HS code of 2903799021. From 1 January 2013, companies engaged in the import or export of the listed chemicals are required to apply for approval from the competent authorities in charge of the management of ODS import and export. A special import and export licence for ODS will be granted to the applicant by the Ministry of Commerce. The licence should be produced during customs clearance. Around 70 ODSs and mixtures have been covered in five batches released earlier.

Source: chemlinked.com

Co-processing ODS gases in Indonesia

Southeast Asia's first facility for the destruction of ozone depleting substances (ODSs) is being run by Geocycle Indonesia. For over a year, the facility has been serving customers who care about chlorofluorocarbon (CFC) emissions and environmental impact. In addition, Geocycle aims to raise awareness of the dangers of releasing ODS gases into the atmosphere through a series of events such as seminars and workshops.

Discussions with the Indonesian and Japanese Ministries of Environment began in 2005; before that, the only ODS disposal option available to the region's waste producers was to export to Australia, an expensive option owing to the high costs of insurance, transportation and destruction. After signing a Memorandum of Understanding in May 2006, the three parties assessed the recommendations in the first report of the United Nations Environment Programme's Technology and Economics Assessment Panel (UNEP-TEAP) and agreed to install an ODS destruction facility at the Narogong-2 cement kiln in West Java.

Modifications to the plant offered three advantages: the costs involved were relatively small; the modification yielded a large destruction capacity; and the facility could be utilized on demand. CFC chains crack at around 900°-1,000°C. In a kiln at 1,500°C with gas temperatures of up to 2,000°C, CFCs decompose quickly and completely. The gases decompose into hydrochloric and hydrofluoric acids that are neutralized with alkaline calcium and go into non-toxic and harmless clinker material. The normal operating conditions of the kiln is not affected by co-processing of ODS. Since the facility opened, 9,600 kg of ODS has been destroyed – equivalent to the global warming potential (GWP) of 44,313 tonnes of carbon dioxide.

Source: www.holcim.com

Europe finds fewer summer ozone peaks in 2012

Ozone pollution did exceed target levels in Europe during summer 2012, but the number of such incidents at the alert threshold was lower than in any year since monitoring started in 1997. However, almost all European Union member states failed to keep levels of the pollutant within targets set to protect human health. The information

comes from a European Environment Agency (EEA) report about ground-level ozone levels in summer 2012. The pollutant can cause respiratory problems and other severe illnesses, besides damaging crops and the wider environment.

During summer 2012, the percentage of sites exceeding the 'alert threshold' was the lowest on record, indicating that peak episodes were shorter and maximum ozone concentrations were lower. Nonetheless, all European Union member states (except Estonia), fell short in the long-term objective to protect human health, and it is very likely that many of them will not meet other targets phased in recently. The lower levels seen during the summer last year were in part due to weather conditions. Ground-level ozone production depends on weather conditions such as sunshine and temperature, and is a result of chemical reactions between other pollutants in the air. These substances are emitted by industry, traffic, farming practices and from other sources. Ozone pollution can travel great distances, meaning that it is both a local air quality issue and also a global, cross-border problem.

Source: www.eea.europa.eu

Industrialists urged to phase out HCFC use in compressors

Environmentalists, climatologists, Earth scientists and meteorologists in Pakistan have urged industrialists, especially manufacturers of refrigerators and air-conditioners, to phase out the use of hydrochlorofluorocarbons (HCFCs) in compressors. Mr. Muhammad Ashraf, National Project Director of the Ozone Cell and Joint Secretary (International Cooperation), Ministry of Climate Change, stated that HCFCs favoured by industry is a powerful greenhouse gas (GHG), contributing to the warming of the planet just as carbon dioxide (CO_2) does. But the effect of many kinds of HCFCs on global warming is much more pronounced than an equivalent amount of CO_2. The global warming impact of fluoroform (HFC-23), a by-product of the production of an HCFC called chlorodifluoromethane, is 11,700 times greater than the impact of an equivalent mass of CO_2, according to the United States Environmental Protection Agency (USEPA).

Mr. Ashraf, who is also Pakistan's focal person on Montreal Protocol, urged industrialists to join government efforts and play their active part in phasing out the environmentally harmful HCFCs. He told participants of a policy-level workshop that industry plays a key role in meeting the 2030 target of 97.5 per cent reduction in HCFC consumption. The phase-out of HCFCs in the refrigeration and air-conditioning (RAC) sector will have a huge positive impact on the protection of ozone layer and reduction of GHG emissions. In addition, the industry can benefit from the savings due to the shift to energy-efficient alternative technologies.

Mr. Gul Najam Jamy, Assistant Country Director of Environment and Climate Change Unit, UNDP Pakistan, stated that the Hydrochlorofluorocarbons Phase-out Management Plan (HPMP) of Pakistan has been under implementation for the past two years and the second stage covering the RAC sector will be developed. One of the key elements of United Nations Environment Programme (UNEP) support, he said, is to assist the National Ozone Unit (NOU) in maximizing ownership of the process and outcome of the HPMP implementation within the government. The implementation of the HPMP is a multi-disciplinary subject that requires co-ordination between different agencies of the government, such as enforcement agencies, standards organizations, energy and climate change agencies, etc.

Mr. Atul Bagai, South Asia Coordinator, UNEP's OzonAction network, stated that besides urging industrialists to play their role, phase-out of HCFC will demand concrete steps to protect the ozone layer. While proposing some workable measures that can help weed out use of HCFCs, Mr. Bagai stated that that all HCFC stakeholders must be aware of the phase-out schedule and available alternatives. Equipment owners must begin to assess the potential impact of the HCFC phase-out when considering new equipment or retrofits of existing equipment. Owners of HCFC equipment or buyers of new RAC equipment must be knowledgeable of HCFC issues. Contractors should provide correct and timely information on HCFCs to technicians and marketing staff and complete information on available ozone-friendly and climate-friendly equipment and refrigerant solutions to customers.

Source: www.brecorder.com

Alternatives to HCFCs in the Foam Sector: Taking on the Challenge

This 15 minute-long short documentary was developed by UNEP OzonAction Branch. It seeks out answers from the technical and scientific experts and showcases some inspiring conversion projects. For more information, contact:

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Cooling system uses lasers instead of refrigerants

Bulky and noisy air-conditioning compressors and refrigerators may soon be a thing of the past. Scientists at Nanyang Technological University (NTU), Singapore, report that a revolutionary cooling system based on lasers could replace current cooling systems based on refrigerants that are harmful to the ozone layer. Other potential applications for the laser-based cooling system include Magnetic Resonance Imaging (MRI) machines, night vision goggles and satellite cameras – all of which require extreme cooling systems.

Dr. Xiong Qihua from the School of Physical and Mathematical Sciences and the School of Electrical and Electronic Engineering had cooled down a semiconductor from 20°C down to –20° C. Before this, the cooling of semiconductors by laser has never been proven. Cadmium sulphide, a group II-VI semiconductor material, is commonly used in sensors, solar cells and electronics. "If we are able to harness the power of laser cooling, it would mean that medical devices that require extreme cooling, such as MRI that uses liquid helium, could do away with their bulky refrigerant systems with just an optical refrigeration device in its place," Dr. Xiong stated. "Not only that, but it would also remove the need for compressors and coolants in air-conditioning and refrigerators used in our homes and automobiles, saving space, energy and greenhouse gases harmful to our ozone layer." The potential for a compact, cost-efficient, vibration-free and cryogen-less cooling system is enormous, as the global market for energy-efficient buildings is estimated to be worth over

Laser-based cooling could outdate conventional refrigerants

US$100 billion by 2017, according to Global Industry Analysts (GIA) reports.

Dr. Xiong and his research team is now looking to bring laser cooling down to liquid helium temperature at (–269°C). This is because theoretically, semiconductors can support laser cooling down to such low temperatures. *Contact: Dr. Qihua Xiong, Assistant Professor, Division of Physics & Applied Physics, School of Physical and Mathematical Sciences, Nanyang Technological University, 637371, Singapore. Tel: +65 65138495; E-mail: qihua @ntu.edu.sg.*

Source: www.nanowerk.com

Ultra low-temperature laboratory freezer

The Glacier 9483 upright 483 L capacity Ultra Low-Temperature Laboratory Freezer from NuAire, the United States, creates a stable, uniform and reliable environment for the preservation of cells while minimizing frost build-up. An energy-efficient cascade cooling system monitors temperature and pressures throughout high- and low-stage circuits. The inner chamber is encircled by foam-in-place polyurethane insulation from all sides. Two insulated inner doors maintain interior temperature during openings. Multiple point gasket seals help lock in cool temperatures and keep ambient air out. A heated bypass coil around the inner doors reduces frost build-up – making it easier to access samples. Consistent temperature uniformity through out the chamber increases cell viability. Glacier freezers use CFC-free refrigerants and insulation (eliminating ozone depletion) while efficient compressors help minimize energy consumption (reducing carbon footprint). *Contact: NuAire, 2100 Fernbrook Lane, Plymouth, MN 55447, United States of America. Website: www.nuaire.com.*

Source: www.biosciencetechnology.com

Servers cool it with liquid refrigerant

Mr. Phil Hughes who founded the start-up Clustered Systems Co., the United States, claims he can pack 200 kW of electronics into a single server rack. Originally, Mr. Hughes planned to build a supercomputer around a new mesh networking technology that he helped develop. But he and his investors discovered their approach to cooling the system was even more valuable than the supercomputer design itself.

Clustered Systems uses sealed cold plates filled with R134a, the same component used in car air-conditioning systems, which are placed next to heat risers, blocks of aluminium that channel heat from the electronics. The heat boils the refrigerant, sending gas and a little remaining liquid off to an external heat exchanger. Outside the server box, cold water or ambient cool air make the refrigerant condense back to a liquid that cycles back to the server plate. There are two versions of the plate. One lies horizontally on the top of a rack-mounted server, while the other stands vertically between the server blades.

Source: www.eetimes.com

Energy optimization for supermarkets

A new concept from Fraunhofer Institute for Solar Energy Systems (ISE), Germany, will enable supermarket operators to cut energy use by around 25 per cent. The focus of the concept lies in the area of cooling, which represents the largest share of the electricity bill – approximately 40-50 per cent. The freezer systems have to reliably store food items like fish and cake at –25°C to prevent spoilage, while sausages and cheese need to be stored at a maximum of 4°C. The ISE researchers have connected all cooling points to a combined central refrigeration system. The heat is not dissipated into the store but channelled via a three-stage recooling system. During winter, the system recovers heat via a heat exchanger and uses it to heat the store. Residual heat is channelled via a gas chiller and geothermal heat pump into the surrounding areas. Heated water is pumped through into the ground where the heat is dissipated and the cold water is fed back. The result is that freezers and chillers require only half the electricity of comparable stand-alone systems. The heating system also has an effect on the ventilation system, which is used not for heating but for introducing fresh air into the store and is hence a third smaller in size.

ISE scientists have chosen carbon dioxide (CO_2), which has a global warming potential (GWP) 3,000 to 4,000 times less than conventional refrigerants. Up until now, carbon dioxide has rarely been used as a refrigerant as the system must withstand high pressures. Further, the system's efficiency is reduced on hot days. To compensate for losses at high ambient air temperatures, ISE scientists, in collaboration with their colleagues at Hafner-Muschler, Germany, integrated a third cooling stage. The scientists also make use of natural daylight, as lighting makes up the second largest share of the electricity bill in supermarkets. New control strategies have enabled the optimization of the concept components so that energy savings of 25 per cent could be achieved, explained Mr. Nicolas Rehault, Group Leader at ISE.

Source: phys.org

Greener solutions for refrigeration

Efficient and environment-friendly technology enables 100 kW condensing units produced by Searle Manufacturing Co. in the United Kingdom to deliver a greener cooling solution for supermarket food halls. Employing hydrofluorocarbon (HFC) or hydrocarbon (HC) with carbon dioxide (CO_2) as refrigerants, the new Cascade units are among the most powerful in the United Kingdom for any commercial supermarket application. The CCU-100-ECI-CO2HC Cascade units, typically roof-mounted, chill and circulate CO_2 to maintain cool temperatures and protect food products in the retail display cabinets on the shop floor. With a power requirement similar to comparable units, a CO_2 Cascade unit would have minimal impact on the environment should a refrigerant release occur: i.e. equal to just 0.38 t of CO_2.

The new generation of Searle units feature electronically commutated (EC) fan sets, which produce energy savings of up to 50 per cent, new fan designs to improve airflow and reduce noise, and advanced coatings to ensure a full life expectancy. Searle is moving towards greener refrigerants and unit designs that make it easier to separate the various metal and other components for recycling when the units are junked. *Contact: GEA Searle, 20 Davis Way, Newgate Lane, Fareham PO14 1AR, United Kingdom. Tel: + 44 (1329) 823 344; Fax + 44 (1329) 821 242; E-mail: searle.hx.uk@gea.com, Website: www.searle.co.uk.*

Source: www.searle.co.uk

Carmakers close to AC emissions breakthrough

A new refrigerant may be able to greatly reduce the global warming potential (GWP) of air-conditioning (AC) systems used in cars. The refrigerant, known as R1234yf, is being tested by the SAE International Cooperative Research Project. According to SAE, R1234yf appears to pose no greater risk than other engine compartment fluids. A study in September 2012 by Daimler, Germany, had raised questions about whether R1234yf is a safe replacement refrigerant in car ACs. The Daimler report even went on to say it would not use the chemical in its products. SAE responded by conducting a detailed review of its original fault tree analysis and significantly expanded this analysis to feature new test parameters. With contributions from numerous parties with a wide range of expertise and experience, SAE continued to review R1234yf for use in ACs in a variety of situations, including on-vehicle and laboratory simulations. Its conclusion is that the refrigerant is "highly unlikely" to ignite and that ignition would require ideal conditions. This has made the group that supports the new refrigerant hopeful that R1234yf may once again be a major breakthrough in automotive AC sector.

Source: www.thegreencarwebsite.co.uk

Environmentally compatible fluorinated solvents

The new line of fluorinated solvents from AGC Chemicals Americas, the United States, has no flashpoint and no ozone depletion potential. Their low global warming potential makes these solvents safer and more environmentally friendly than traditional halogenated solvents. The AsahiKlin AE-3000 Series is designed for use as precision cleaning solvents, moisture displacement fluids, defluxing agents for electronics and carrier solvents for lubricants. The AE-3000 Series, developed by Asahi Glass Co., Japan, comprises four products that are non-inflammable and non-corrosive. They have low surface tensions, low viscosities and high liquid densities. The solvents are chemically and thermally stable, are suitable replacements for hydrochlorofluorocarbons (HCFCs), and have the following features:

- AsahiKlin AE-3000 is a hydrofluoroether for precision cleaning of metals, alloys, composites and plastics and is designed as carrier solvent for fluorinated oils, silicone oils and greases.
- AsahiKlin AE-3000ATE is a mixture of trans-1,2-dichloroethylene, 1,1,2,2-tetrafluoroethyl-2,2,2-trifluoroethyl ether, ethanol and a stabilizer. It is designed for defluxing printed wiring assemblies; precision cleaning of plastics, metals, substrates and electrical components; and particle removal. It is a suitable replacement also for perchloroethylene/trichloroethylene.
- AsahiKlin AE-3000AT also is a mixture of trans-1,2-dichloroethylene, 1,1,2,2-tetrafluoroethyl-2,2,2-trifluoroethyl ether and a stabilizer. It is designed for removing greases and oils from metal and electrical components and is a suitable replacement also for perchloroethylene and trichloroethylene.
- AsahiKlin AE-3100E is a hydrofluoroether that offers outstanding drying and thus works as a high-performance drying agent after wet plating, for carbide metal before coating for cleaning and for drying after cleaning. It is also well suited to precision cleaning and dewatering, and for defluxing of electronics, electrical components and printed wiring assemblies.

Contact: AGC Chemicals Americas Inc., 55 E. Uwchlan Avenue, Suite 201, Exton, Pennsylvania 19341, United States of America. Tel: +1 (610) 4234 300; Website: www.agcchem.com.

Source: www.sustainableplant.com

Eliminating GHGs from PCB production

Magna plasma etching eliminates the need for tetrafluoromethane

In the United States, Plasma Etch Inc. has announced the development of fluorinated solvents to replace halogenated solvents. It is now offering the world's first truly green plasma etching system for use in the production of printed circuit boards (PCBs). The company has developed a technology called the Magna Series (patent pending) that eliminates the need for tetrafluoromethane (CF_4) gas, a potent greenhouse gas (GHG) with a global warming potential of 6,500, which is presently used daily by PCB manufacturers throughout the world with the use of plasma etching systems for desmear and etchback processes.

An additional advantage is that the Magna Series technology will not require the use of oxygen bottles (gas tanks) presently required. The Magna Series is also reported to need significantly less power than traditional plasma etching systems currently in use. According to the company, the Magna Series has set new market standards in many other key areas. The new technology provides for faster etch times, lower operating cost and process uniformity not achievable with existing technologies. *Contact: Plasma Etch Inc., 3522 Arrowhead Drive, Carson City, Nevada, NV 89706, United States of America. Tel: +1 (775) 883 1336; Fax: +1 (775) 883 2559; E-mail: sales@plasmatech.com.*

Source: news.thomasnet.com

Eco-friendly solvent cleaner/degreaser

Solvon solvent cleaner/degreaser from Poly Systems Inc., the United States, is an azeotrope-like blend formulated to perform like trichloroethylene (TCE) without adverse effects on the environment. Solvon is an n-propyl bromide solvent that employs a patented stabilizer for longer life and has no flashpoint. An approved replacement for ozone depleting solvents in vapour degreasing applications, Solvon is not regulated as a hazardous waste or as a hazardous air pollutant under relevant United States regulations. Solvon is used to clean aerospace, automotive, medical, electronic and general metal components and in a variety of specialty applications.

Source: www.pfonline.com

High-pressure atomized water mist

Tyco/ADT Worldwide, the United Kingdom, offers Tyco MicroDrop® high-pressure water mist system. This system typically works at a pressure of 100 bar to deliver water as a fine atomized mist. This mist is quickly converted into steam that smothers the fire and prevents further oxygen from reaching it. At the same time, the evaporation creates a significant cooling effect. In this way, water mist combines the fire suppression properties of both conventional water-based deluge or sprinkler systems and gaseous systems. The surface area of the water droplets is optimized and their transit time (before hitting surfaces) lengthened in order to maximize the benefits of water's excellent heat absorption properties. In doing so, fire suppression of surface flaming fires can be achieved by a combination of:

- Heat extraction from the fire and fuel;
- Oxygen reduction by steam smothering at the flame front;
- Blocking of radiant heat transfer; and
- Cooling of combustion gases.

In order to be effective, the droplets must reach and be entrained in the combustion airflow. With MicroDrop® high-pressure water mist systems, this is successfully achieved with additional velocity to penetrate the fire. The average droplet size of a Tyco MicroDrop® high-pressure water mist system 'mist' yields a total surface area that is at least 100 times greater than conventional sprinkler droplets for the same volume of water. Therefore, much smaller amounts of water are required to absorb the equivalent amount of energy from the fire. Inerting (oxygen depletion) at the flame front can also take place locally or in the enclosed space, particularly where the fire is large in relation to the space. A further highly beneficial effect is the dramatic reduction of harmful products of combustion caused by washing out of smoke particles from the fire. *Contact: Tyco/ADT Worldwide, Security House, The Summit, Hanworth Road, Sunbury-on-Thames, Middlesex TW16 5DB, United Kingdom. Tel: +44 (193) 274 3333; Fax: +44 (193) 276 1623.*

Source: tsp-europe.com

Fire suppression system that uses Novec 1230

Firemaster Extinguisher Ltd., the United Kingdom, offers the MP-2-0000 Novec 1230 automatic fire suppression unit, the first system of its type using 3M's clean and environmenta-friendly Novec 1230, a 'drop-in' replacement for the outlawed halons, pressurized using nitrogen. Developed to suit use in such diverse enclosed areas as plant rooms, engine rooms, switchgear rooms and machine spaces, the Firemaster MP-2-0000 Novec 1230 units are suitable for B and C class fires and are safe for use on electrical equipment. The units, designed to operate automatically at a temperature of 68°C (±5°C), are also available with optional single or dual facility, enabling remote manual operation, both electrically and mechanically. Novec 1230 fluid is heavier than water and is an effective fire extinguishing agent in standard fire scenarios where previously halons were used. It has a low global warming potential, zero ozone depletion potential and a short atmospheric life. *Contact: Mr. John Wellborne, Firemaster Extinguisher Limited, Firex House, 174-176 Hither Green Lane, Lewisham, London SE13 6QB, United Kingdom. Tel: +44 (20) 8852 8585; Fax: +44 (20) 8297 8020; E-mail: info@firemaster.co.uk; Website: www.firemasterco.uk.*

Source: www.voltimum.co.uk

Water mist fire suppression system

Aquasonic water-atomizing fire suppression system in operation

Compared with typical water mist systems, the Ansul® Aquasonic™ water-atomizing fire suppression system from Koetter Fire Protection LLC, the United States, produces a higher volume of smaller water droplets and projects them further. The high-performance fire suppression system is engineered to cover a wide range of special hazard applications. It uses as extinguishing media water and nitrogen, which are non-toxic and readily available. Aquasonic twin-fluid technology is safe and environment friendly, as well as inexpensive to recharge. The system has few moving parts and uses tested technology with decades of proven service.

Class B inflammable liquid hazards can be protected by the total flooding abilities of the Aquasonic system. Two supersonic atomizers create 1.5 trillion superfine water droplets per second, producing a

combined surface area of 121 m^2 per second. Furthermore, the atomizers propel the droplets at high velocity throughout the combustion zone. Patented supersonic technology of the atomizer generates a high-velocity, low-pressure zone that draws a thin sheet of water into a primary atomization region. A conical supersonic wave then creates a zone of high acceleration and shear rate, breaking the sheet into atomized droplets, which extracting heat from the fire. The self-contained Aquasonic system is capable of automatic detection and actuation and/or remote manual actuation. *Contact: Koetter Fire Protection LLC, 10351 Olympic Drive, Dallas, Texas 75220, United States of America. Tel: +1 (214) 3583 593; Fax: +1 (214) 3509 930; E-mail: info@koetterfire.com.*

Source: www.koetterfire.com

Powder aerosol fire extinguishing systems

AFG Flame Guard USA LLC, the United States, offers dry sprinkler powdered aerosol (DSPA) based fire suppression system that extinguishes and suppresses fires in less than a few seconds. DSPA is said to be ten times as effective as halon 1301. It is effective for fire classes A, B, C and K, and is manufactured by DSPA.nl, a subsidiary company of AFG Group, the Netherlands. DSPA extinguishing systems act volumetrically like the halon systems they were designed to replace. This means that a compartment is filled with a minimum quantity of extinguishing material that acts directly on the ignition mechanism of the flame. The solid material of the DSPA system, as opposed to gas systems, enables interaction with the surface of the burning material. Consequently, the flames are extinguished rapidly. DSPA generators, available in either fixed systems or manually deployed units, are started via a thermal reaction, either electronically or manually. This thermal reaction transforms the potassium-based compound encased in the generator into an aerosol. Upon being transformed from a solid compound, the product is ejected from the generator 360° as an aerosol at a rate of 3,200 to 1. Total deployment takes approximately 40 seconds.

DSPA has been installed in a wide range of premises where other fire suppression systems are just not practical or are price prohibitive. DSPA requires no pipe work or pressure, so it is easily installed without any disruption. The small amount of residue following activation can be cleaned away easily, either by cloth or vacuum. DSPA substantially minimizes property damage caused, not only by the fire itself but also by alternative extinguishing methods. *Contact: AFG Flame Guard USA LLC, 2559 Pick Drive, Glenview, Illinois, IL 60025, United States of America. Tel: +1 (855) 3772 100; E-mail: info@flameguardusa.com.*

Source: www.flameguardusa.com

Water atomization and mist delivery system

ADA Technologies Inc., the United States, is patenting a water atomization and mist delivery system. The invention covers a water atomization and water mist delivery system in which water and a gas are mixed in an aspirating device and provided to a nozzle. The mixture may be delivered from the nozzle to provide fire protection and suppression. The aspirating device may be configured like an aspirating venturi in which both a liquid and a gas flows through the throat of the venturi. The liquid may be water and the gas may be nitrogen. The invention can provide a number of advantages depending on the particular configuration. For example, the embodiments can use an effervescent means to atomize the water without the need for high pressure. The invention, it is claimed, can extinguish an exothermic event from a longer throw distance quickly, safely as well as more economically than traditional fine water mist and/or water atomization devices and methods.

Source: patentscope.wipo.int

Fire prevention equipment

Hochiki Corp., Japan, is patenting a new fire prevention equipment that enables wide protection range by extending the flying distance of fire-extinguishing agent particles – electrified and sprayed from a head. A water-based fire-extinguishing agent is pressurized and supplied to an electrification spray head installed in a protection area via a pipe. The jet particles of the fire-extinguishing agent are electrified and sprayed from the electrification spray head. The electrification spray head mixes and sprays the fire-extinguishing agent in comparatively small particle size (30-200 μm) via a small-particle jet nozzle as well as in comparatively large particle size (200-2,000 μm) via a large-particle jet nozzle. In doing so, the fire-extinguishing agent particles having small particle size get carried to the target by the air current caused by jet-spraying the fire-extinguishing agent particles having large particle size for effective fire suppression.

Source: www.freepatentsonline.com

Enhancing oil recovery with carbon dioxide foam

The Centre for Enhanced Oil Recovery (EOR) and CO2 Solutions at Heriot-Watt University, the United Kingdom, is internationally recognized as a centre of excellence for developing new and improved EOR technologies for application in conventional and heavy oil reservoirs across the world. The Centre is investigating how carbon dioxide (CO_2) injection should be utilized for oil recovery and during sequestration to support investment decisions at the field scale. CO_2 or any gas is a lot more mobile. It snakes through the reservoir, increasing the chance of premature breakthrough, according to Prof. Mehran Sohrabi at the University. Prof. Sohrabi's team conducts tests to gauge the effectiveness of CO_2 foam at different reservoir conditions at pore scale and core scale and different grades of crude oil. Results have shown that foams stand up better to higher saturations of viscous crudes and in largely depleted reservoirs, foam can extract oil that other methods are unable to do. CO_2 foam is twice as effective at clearing out crude oil in porous rock as a solution of water and CO_2 gas.

Source: www.hw.ac.uk

Composition for manufacturing a tannin-based foam material

Together with five inventors, Italy's Silvachimica S.R.L. and France's Universite de Lorraine's Institut Enstib-Lermab are patenting a composition and the process to manufacture a tannin-based foam material, and the foam material obtained through the process. The composition for manufacturing the foam material based on flavonoid tannins includes a flavonoid tannin powder – mainly of the prorobineditinidin and/or the profisetinidin type – in an amount in the range of 40-45 per cent by weight of the composition, furfuryl alcohol, a blowing agent and a catalyst. The composition is totally free of formaldehyde and contains furfuryl alcohol in an amount greater than 20 per cent in weight of the composition. The foam can be used in, typically, the fields of building and in the automotive industry.

Furfuryl alcohol is used with the aim of replacing formaldehyde used in the known compositions. A liquid is used as the blowing agent, the boiling point of which is between 30°C and 100°C, ideally between about 40°C and 60°C, conveniently based on ethyl ether, pentane and/or a mixture of isomers of pentane and preferably consisting of diethyl ether. The catalyst preferably consists of p-toluenesulphonic acid (p-TSA) or, as an alternative, trichloroacetic acid. Water can also be used according to an amount in weight up to 15 per cent of the composition, preferably 8-9 per cent. Moreover, an isocyanate can be added to the composition, such as polymeric diphenylmethane diisocyanate (PMDI) to increase the mechanical strength of the foam material. *Contact: Silvachimica S.R.L., Via Torre 7, San Michele Mondovì, I-12080, Italy.*

Source: www.sumobrain.com

Water-blown polyisocyanurate/ polyurethane foam

Bayer Intellectual Property GmbH, Denmark, along with four inventors is patenting method for producing a water-blown polyurethane/polyisocyanurate rigid foam material that can be sprayed, by reacting a mixture comprising: an aromatic polyester polyol; a first, comparatively short-chain aliphatic polyether polyol; a second, comparatively long-chain aliphatic polyether polyol; an isocyanate; and a blowing agent with water as a main component and a catalyst component. The invention further relates to a rigid foam produced using the invented method, to a composite material composed of the said rigid foam and a pipe, and to the use of such a composite material for transporting liquid or gas media. *Contact: Bayer Intellectual Property Gmbh, Creative Campus, Alfred-Nobel-Str. 10, Geb. 4865, 40789 Monheim, Denmark.*

Source: patentscope.wipo.int

A natural foaming technology using CO_2 blowing agent

Carpenter Co., the United States, has developed Natural Foaming Technology™ that employs carbon dioxide (CO_2) as a foam blowing agent instead of harmful or ozone depleting chemicals. One of the results of this novel technology is Renew™, a bio-based foam that helps reduce dependence on fossil fuel.

The fully recyclable Renew is made without the use of chlorofluorocarbons (CFCs) and uses a soy bean-based polyol. The foaming process renders the foam free of polybrominated diphenyl ether (PBDE), a persistent organic pollutant (POP). Renew is available in a wide range of firmnesses and densities. *Contact: Carpenter Co., 5016 Monument Avenue, Richmond, Virginia, VA 23230, United States of America. Tel: +1 (804) 3590 800.*

Source: carpenter.com

Multi-fumigant scrubbing system

Mr. Pete Swords at Insects Ltd. demonstrates the new technology

Insects Ltd., the United States, offers a multi-fumigant scrubbing system. This new technology was developed to capture and destroy fumigant gases such as methyl bromide, methyl iodide and, sulphuryl fluoride, which might otherwise be released into the atmosphere from a variety of fumigation situations. Applications for the F.A.S.T System include, but not limited to, ISPM-15 pallets, shipping containers, export quarantine logs, trailers, fumigation chambers, flour mills and grain bins. The system is designed to draw out and break down fumigant gases from fumigated area by forcing contact of the gas with a non-carbon-based scrubbing material through a specially designed filter head.

The fumigant is agitated with a solution causing complete chemical breakdown of the fumigant gas into liquid and other non-hazardous by-products. Speed of the system can be increased or decreased to fit proper aeration and abatement allotments. Unlike most abatement systems, this new technique has the ability to destroy harmful fumigants at the site itself, whereas others only capture the fumigant for a short time, eventually allowing it to escape into the atmosphere. The new durable and easily operated design allows an accelerated and convenient process for removing harmful and potential safety hazards from fumigants. *Contact: Mr. Pete Swords, Insects Ltd., 16950 Westfield Park Road, Westfield, Indiana, IN 46074, United States of America. Fax: +1 (317) 867 5757; E-mail: p.swords@insectslimited.com.*

Source: www.insectslimited.com

Dimethyldisulphide as soil fumigant

Arkema, France's leading chemicals producer, reports that its research and development groups have developed a new soil fumigant based on dimethyldisulphide (DMDS) to fight sustainably against soil pests in the cultivation of fruit and vegetables. The fumigant was developed against a background of worldwide substitution of older fumigation products, which are being gradually withdrawn due to regulatory issues. At present, Arkema and Certis, the exclusive distributor of DMDS in Europe, are preparing for the arrival of this new product on the market and work with the authorities to progress rapidly on the approval of DMDS.

Source: www.4-traders.com

Fumigants from Chinese herb

Scientists in China have tested the efficacy of fumigant compounds extracted from the essential oil of *Blumea balsamifera,* a Chinese herb, against maize weevil *(Sitophilus zeamais).* Essential oil from the leaves of the medicinal herb was found to possess fumigant toxicity against *S. zeamais.* The main components of the essential oil of the herb are 1,8-cineole (20.98 per cent), borneol (11.99 per cent), β-caryophyllene (10.38 per cent), camphor (8.06 per cent), 4-terpineol (6.49 per cent), α-terpineol (5.91 per cent) and caryophyllene oxide (5.35 per cent). Bioactivity-guided chromatographic separation of the essential oil on repeated silica gel columns led to isolate five constituent compounds, viz. 1,8-cineole, borneol, camphor, α-terpineol and 4-terpineol.

Pronounced fumigant toxicity was shown against *S. zeamais* adults by 1,8-cineole, 4-terpineol and α-terpineol (LC50 = 2.96 mg/l, 4.79 mg/l and 7.45 mg/l air, respectively), which were more toxic than camphor (LC50 = 21.64 mg/l air) and borneol (LC50 = 21.67 mg/l air). The crude essential oil also possessed strong fumigant toxicity against *S. zeamais* adults (LC50 = 10.71 mg/L air). *Contact: Ms. Sha Sha Chu or Mr. Zhi Long Liu, Department of Entomology, China Agricultural University, 2 Yuanmingyuan West Road, Haidian District, Beijing 100193, China.*

Source: www.hindawi.com

Thermal solutions for pest eradication

AZEX Thermal Solutions, the United States, offers its AZEX HEAT process for pest eradication, bed bug control, dust mite control and so on. AZEX HEAT is a safe, effective, non-toxic pest control approach accepted by the pest control industry. AZEX uses only natural heat and no ozone depleting chemicals such as methyl bromide, and bedbugs and other similar pests can survive in such high temperatures. The safe, reliable and convenient process heats up the ambient air temperature of the affected room to between 60°C and 71ºC to effectively kill pests and their eggs. In much the same way as AZEX HEAT works to eliminate bed bugs, it works to reduce the presence of air pollutants and other harmful or annoying organisms such as bac-

teria, viruses, allergens and dust mites, and also reduces odours. *Contact: Azex Thermal Solutions, AZEX Pest Solutions-Prescott, P.O. Box 11493, Prescott, Arizona 86304, United States of America. Tel: +1 (928) 4455 820; Fax: +1 (928) 4455 815; E-mail: info@azexthermalsolutions.com.*

Source: azexthermalsolutions.com

Pre-plant alternatives to methyl bromide

Researchers at the University of California-Davis, the United States, have studied integrated pre-plant alternatives to methyl bromide for almonds and other stone fruits. This project has been part of the Pacific Area-Wide Pest Management Programme for Integrated Alternatives to Methyl Bromide (PAW-MBA) since 2006 and has established 15 replicated replant trials in commercial orchards and experiment stations. The trials ranged from 0.5 acres to 15 acres in size and included 5 to more than 20 treatments per each experiment. Phase I trials emphasized testing and demonstrating shank-applied methyl bromide alternative fumigant formulations and optimizing placement of the fumigants. The focus was on control of Prunus replant disease (PRD), the most widespread almond and stone fruit replant problem. Replicated yield and growth data are collected annually from four of these trials.

Phase II trials replant was established on sand-textured, nematode-infested soils in Merced County and included shank-applied fumigant treatments as well as non-fumigant treatments (i.e. tree site applications of *Brassica* seed meal and steam). These trials replanted almond after almond and will start producing yields in summer 2013. Phase III trials were established in 2011 and 2012 at the United States Department of Agriculture's Agricultural Research Service (USDA-ARS) to examine potential contributions of rootstock genetics to PRD management. Each rootstock was replanted in replicate plots of non-fumigated and Telone C35-fumigated soil after removal of an almond planting on Nemaguard rootstock. Rootstock growth was monitored to assess resistance to PRD. The data sets and summaries are being evaluated.

Source: mbao.org

Evaluation of sulphuryl fluoride as a soil fumigant

In China, scientists from the Institute of Plant Protection, Chinese Academy of Agricultural Sciences, and the State key Laboratory for Biology of Plant Diseases and Insect Pests studied the efficacy of sulphuryl fluoride (SF) as a soil fumigant in greenhouses. Root-knot nematodes and soil-borne diseases constrain the rapid development of agriculture in China, while phasing out methyl bromide (MeBr). SF fumigant is currently used, as an MeBr alternative, for disinfesting buildings as well as post-harvest commodities.

Dose-response experiments indicated that SF has good efficacy on root-knot nematodes (*Meloidogyne spp.*) and moderate activity against *Fusarium spp.* and weeds (*Digitaria sanguinalis Scop.* and *Abutilon theophrasti Medicus*). The field trials indicate that SF has good efficacy, between 80-94 per cent, on *Meloidogyne spp.*, and *Fusarium spp.* at the rates of 25-50 g/m^2 in tomato and cucumber in Beijing and Shandong Province. Marketable yield and plant vigor was not significantly different in SF and MeBr treatments. SF has lower emissions than MeBr during fumigation. It is simple to apply, can be used at low temperature, and has a short plant-back time. SF was found to be an economically feasible alternative to MeBr as a soil fumigant to control root-knot nematodes and to reduce the levels of key soil pathogens.

Source: www.ncbi.nlm.nih.gov

Evaluation of an automatic steam applicator

Researchers at the University of California-Davis, the United States, have investigated the use of automatic steam applicator for strawberry crops. Steam is an effective non-fumigant tool for soil disinfestation, as it kills pathogens and weed propagules in the soil. Physically blending steam with soil increases the speed and efficiency of steam application. Combining steam with exothermic compounds or biofumigants such as mustard meal may be a method to improve the performance of steam at lower energy cost. Steam application in field buffer zones where fumigants cannot be applied and fumigant use in less restricted areas is a strategy to allow more complete land utilization, especially near urban areas. Steam may also be used to disinfest field soil prior to blending with substrates such as peat or coir, as well as to treat recycled substrates used in two or more production cycles. The oft-cited limits to steam use (such as high fuel costs and slow speed) can be partially overcome using technology already available. The ability to use this technology in both conventional and organic production systems is another added benefit.

Source: mbao.org

GreenChill Best Practices Guideline Commercial Refrigeration Retrofits

The United States Environmental Protection Agency (USEPA) GreenChill Advanced Refrigeration Partnership is a group of refrigeration industry manufacturers and supermarkets striving to achieve reductions in refrigerant leaks in supermarkets. This guide on best practices for commercial refrigeration retrofits includes rationale for hydrofluorocarbon (HFC) refrigerant retrofits, best practices for transitioning to HFC-substitute chemicals and end-of-service-life options, and refrigerant recovery and recycling. It also includes updated information on: the phase-out of R22; ICOR International's R422B and R422C; Honeywell's performance data, case histories and a checklist for R407F; Arkema performance data on R407A; and DuPont's R438A.

Contact: GreenChill Advanced Refrigeration Partnership, United States Environmental Protection Agency, Ariel Rios Building, 1200 Pennsylvania Avenue, N. W., Washington, DC 20460, United States of America. Tel: +1 (202) 3439742; E-mail: witman.keilly@epa.gov.

Handbook for Critical Cleaning: Applications, Processes and Controls

This guide addresses how to implement, validate, monitor and maintain a critical cleaning process. Topics include cleanrooms, materials compatibility, worker safety, sustainability and environmental constraints. The book shows readers how to draw from diverse disciplines – including aerospace, electronics, art conservation, food, life sciences, military, optics and semiconductors – to achieve superior productivity. It delves into topics including cleaning agents and systems, process validation and monitoring, analytical techniques, cleanroom design/operation, specific applications, worker safety and sustainability/environmental considerations. The book addresses current manufacturing challenges, including increasing performance requirements, miniaturization, complex supply chain, economic pressures and environmental/safety constraints. It offers a balanced perspective that helps manufacturers make prudent business decisions.

Contact: CRC Press, United Kingdom. Tel: +44 (1235) 400524; Fax: +44 (1235) 400525; E-mail: book.orders @tandf.co.uk.

14-15 May
Mainz
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Blowing Agents and Foaming Processes 2013
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25-27 Sep
Bad Krozingen
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5th International Conference on Solar Air-Conditioning
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