

Press release

Natural Refrigeration Award 2017

Award winners honoured at the eurammon Symposium in Schaffhausen

Frankfurt (Main), 1 August 2017 – Every two years, eurammon, the initiative for natural refrigerants, rewards young scientists for pioneering research in the field of natural refrigerants. This year, the Natural Refrigeration Award prize of €5,000 was awarded with support from the Technical University Braunschweig and the Czech trade journal Chlazení. The prizes were awarded to the three winners on 22 June 2017 during the eurammon Symposium, where they were also able to present and discuss their research work and results relating to the use of natural refrigerants such as ammonia and CO₂ with the international expert audience at the symposium.

The first prize was won this year by Peng Gao from Shanghai Jiao Tong University (China). His dissertation related to the development of an innovative solid sorption freezing system for refrigerated trucks. The system uses the exhaust gas generated by combustion of the fuel in the truck engine at temperatures between 200°C and 500°C for refrigeration in a two-stage solid sorption freezing cycle operated with the natural refrigerant ammonia. The innovative system is superior to the mechanical vapour compression refrigeration system usually to be found in refrigerated trucks in terms of both costs and environmental protection: the operating costs and the related CO₂ emissions for the refrigeration system are close to zero. The system is also suitable for refrigerated lorries carrying frozen goods, even in ambient temperatures of up to +30°C. The research results convinced the international jury and triggered great interest among those attending the eurammon Symposium. "The dissertation clearly shows the potential of research in the field of natural refrigerants, also indicating the economical and ecological advantages that can be achieved with innovative applications", explained Monika Witt, Vice-chair of eurammon.

The second prize went to the students Dennis Lerch and Stefan Brinkmüller for their project assignment as part of their engineering course at HsKA Karlsruhe University of Applied Sciences (Germany). They developed the BFBGL – the "Green Line Bavarian Breakfast Preparation Unit". The mobile high-temperature heat pump has a cold and a hot water basin for cooling 35 bottles of wheat beer from 20°C to 5°C, while at the same time heating 70 Bavarian "Weisswurst" sausages from 20°C to 80°C. The unit uses the natural refrigerant

isobutane (R 600a). With view to the high pressure ratio required a semi hermetic piston compressor was selected. The beer is cooled by a self-designed tube coil evaporator with medium-high finned tubes, which absorbs the thermal energy effectively through the circulating pump. The condenser was constructed as a plate heat exchanger that transfers the heat to the hot water basin keeping the refrigerant charge as low as possible. A thermostatic expansion valve was also developed especially for the project. The BFBGL is a prime example how natural refrigerants can be used in environmentally friendly refrigeration technology, impressively and practically underlining the efficiency.

The third prize was awarded to the dissertation by Marco Cefarin from the Università degli Studi di Udine (Italy). The aim of the parametric study was to design an $\text{NH}_3\text{-H}_2\text{O}$ absorption refrigeration system that is also capable of making maximum use of industrial waste heat at low temperatures. A mathematical reference model with a pre-condenser heat exchange dephlegmator reached a COP level of 0.471. While maintaining constant condensating and evaporating temperatures, there was a drop in efficiency at low generator temperatures. The optimum minimum generator temperature was also influenced by different system parameters, such as the size of the heat exchanger and the fluid flow rate. The concentration gradient of ammonia between rich and lean solution was identified as being a central criterion for possibly using a heat recovery concept. The data predicted in the theoretical model were then verified and confirmed in a reference system.

More information about the Natural Refrigeration Award together with the dissertations and projects of the prizewinners is available on the eurammon homepage <http://www.eurammon.com/>.

Pictures

Picture 1:



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Caption: The winners of the Natural Refrigeration Award 2017 were honoured during this year's euramm symposium. From left to right: Bernd Kaltenbrunner (euramm), Peng Gao, Dr. Karin Jahn (euramm), Monika Witt (euramm), Marco Cefarin, Dennis Lerch.

Picture 2:



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Caption: Peng Gao won the first prize of the Natural Refrigeration Award 2017.

About eurammon

eurammon is a joint initiative of companies, institutions and individuals who advocate an increased use of natural refrigerants. As a knowledge pool for the use of natural refrigerants in refrigeration engineering, the initiative sees as its mandate the creation of a platform for information sharing and the promotion of public awareness and acceptance of natural refrigerants. The objective is to promote the use of natural refrigerants in the interest of a healthy environment, and thereby encourage a sustainable approach in refrigeration engineering. eurammon provides comprehensive information about all aspects of natural refrigerants to experts, politicians and the public at large. It serves as a qualified contact for anyone interested in the subject. Users and designers of refrigeration projects can turn to eurammon for specific project experience and extensive information, as well as for advice on all matters of planning, licensing and operating refrigeration plants. The initiative was set up in 1996 and is open to companies and institutions with a vested interest in natural refrigerants, as well as to individuals e.g. scientists and researchers.

Internet URL: www.eurammon.com

Contacts

eurammon contact
eurammon
Dr. Karin Jahn
Lyoner Strasse 18
D-60528 Frankfurt
Germany

Phone: +49 (0)69 6603-1277

Fax: +49 (0)69 6603-2276

E-mail: karin.jahn@eurammon.com

Press contact

FAKTOR 3 AG

Katarina Lisci

Kattunbleiche 35

D-22041 Hamburg

Germany

Phone: +49 (0)40 679446-6187

Fax: +49 (0)40 679446-11

E-mail: eurammon@faktor3.de

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