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Review of Warming and Artificial and Natural Chillers

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Abstract

The Montreal Protocol outlawed halogenated hydrocarbons with high ozone depletion potential because of their negative effects on the ozone layer, which protects the planet from ultraviolet radiation. Modern refrigeration, air conditioning, and heat pump systems use greenhouse gases that are subject to the Kyoto Protocol's time-barred permission period. Both the Paris Climate Accord and European Union legislation place a strong emphasis on the gradual phase-out of the use of harmful synthetic refrigerants in order to lessen ozone depletion and reverse the effects of climate change. The use of natural refrigerants has no discernible impact on the amount of Greenhouse Gases (GHG) in the atmosphere. Extensive research is being conducted globally to retrofit and modify existing cooling and heating systems using natural refrigerants.

Keywords: Halogenated • Hydrocarbons • Greenhouse • Ultraviolet

Introduction

The Refrigerant Qualitative Parametric (RQP) quantification model is used in this study to review old, current, and next-generation refrigerants in order to aid in the refrigerant selection process. The ratio of the arithmetic sums of the actual parametric values of the refrigerants, normalised to the corresponding ideal values, forms the basis for this. By replacing CFCs with HCFCs or HFCs initially and then with low GWP and ODP synthetic and natural refrigerants, this model can aid in the selection of substitute refrigerants. Based on the proposed model, a set of 16 natural and synthetic refrigerants are computed for the typical Vapour Compression Cycle (VCC) using REFPROP (NIST- 23 standard). The international environmental laws, ASHREA safety standards, and cited literature are used to determine the techno-economic parametric values of the selected refrigerants [1].

A substance or mixture that is typically a fluid and is used in the heat cycle to undergo a reversible phase transition from a liquid to a gas and back is known as a refrigerant. Refrigerants are fluids that act as a heat transfer medium in a wide variety of appliances, including water heaters, air conditioners, and refrigerators. For applications requiring only selective cooling and heating, refrigerants with the right characteristics are chosen. Before electricity was developed in the 1880s, refrigeration technology was being used by human society. This concept was used by Jacob Perkin in the construction of his first refrigerator in 1834.In effort to predict the availability of food in the future, numerous studies have examined the effects of changes in temperature, precipitation, and atmospheric CO_2 concentration on crop yields. Wheat, rice, and maize in particular have received special attention because they account for about half of the world's food Chlorofluorocarbons (CFCs), a class of synthetic refrigerants, were prohibited by the Montreal Protocol because they were found to contribute to stratospheric ozone depletion. The Hydro Fluorocarbons (HFCs) and Hydro Chlorofluorocarbons (HCFCs) were proposed as alternatives in the 1980s [2].

Literature Review

HCFC phaseout was set for 2020–2030 and HFC phaseout was set for 2025–2040 in the Kyoto Protocol. A short-term permit to use HFC is not a justification; it is an interim measure. The deadline is quickly approaching, but many nations are rude, hesitant, uninformed, or lacking in financial or technical resources. This study examines the past, present, and outlook for refrigerants and aids in the decision-making process for switching from high to low GWP and natural refrigerants for current and future heating and cooling [3].

In an effort to predict the availability of food in the future, numerous studies have examined the effects of changes in temperature, precipitation, and atmospheric CO_2 concentration on crop yields. Wheat, rice, and maize in particular have received special attention because they account for about half of the world's food energy intake and are grown on about 42% of cropland worldwide. Low latitudes, which are home to developing nations, will likely experience consistent negative climate effects on crop production, whereas northern latitudes may experience either positive or negative effects. Without CO_2 fertilisation, effective adaptation, and genetic advancement, rising temperatures from climate change will adversely affect production at the global level in the case of wheat, rice, and maize crops, though this will vary for crops and livestock [4].

Chlorofluorocarbons (CFCs), a class of synthetic refrigerants, were prohibited by the Montreal Protocol because they were found to contribute to stratospheric ozone depletion (1987). The hydro fluorocarbons (HFCs) and hydro chlorofluorocarbons (HCFCs) were proposed as alternatives in the 1980s. It was discovered that HCFCs have a high potential for causing global warming and ozone depletion HCFC phaseout was set for 2020–2030 and HFC phaseout was set for 2025–2040 in the Kyoto Protocol. A short-term permit to use HFC is not a justification; it is an interim measure. The deadline is quickly approaching, but many nations are rude, hesitant, uninformed, or lacking in financial or technical resources. This study examines the past, present, and outlook for refrigerants and aids in the decision-making process for switching from high to low GWP and natural refrigerants for current and future heating and cooling [5].

Discussion

Water (R-718) is a non-toxic, non-flammable substance that is widely distributed throughout the entire planet. Although R-718 has a greater capacity for refrigeration than CFCs, it requires ten times the volumetric flow, which raises the cost of axial or centrifugal compressors. When used as a refrigerant in a multi-stage compressor unit with inter-cooling, Lee's simulation study showed that vapour R-718 has a 30% higher COP than synthetic R-134a at full load. For an evaporation temperature above 35 °C, presented a simulation-based comparison of R-718 with R-290, R-717, R-134a, R-22, and R-152a, and discovered that R-718 exhibited higher COP. R-718's thermo physical characteristics allow for the achievement of COP, but its high critical temperature (373.95Some of these fungi display extraordinary physiological plasticity, which has helped them adapt to and colonize a variety of ecological niches, including those of many staple foods, such as cereals. In actuality,

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cereals are the Methane (R-50), ethane (R170), propane (R-290), butane (R-600), isobutene (R-600a), ethylene (R-1150), and propylene are hydrocarbon (HCs) refrigerants (R-1270). HCs are less harmful to the ozone than HFCs and have a lower GWP. The material of existing refrigeration and heat pump systems is compatible with HCs, which also has excellent miscibility with synthetic oil, a lower refrigerant charge, and lower refrigerant charge. The extremely low boiling points of methane (R50) and ethane (R-170), two flammable cryogenic liquids, are 162 °C and 88.58 °C, respectively. These are employed for refrigeration at extremely low temperatures (80 °C). Researchers in contact with the industry have reported safety concerns for HCs like propane, which seem to be excellent candidates. R-290 and R600 are flammable substances but share many traits with halogenated HCs. R-290 has more cooling power [6].

Domestic refrigerators, freezers, and air conditioners all use HCs refrigerants. Commercial applications range from 0.3 (1 kW) to 40 (150 kW) tonne chillers, truck-mounted refrigerators, heat pumps, and beverage and ice-cream makers. R-290 and R-600a can be used in household refrigerators, and R-170 (for sealed hermetic) can be used in low temperature applications for commercial equipment used for medium and high temperatures. In Europe and other parts of the world, domestic refrigeration units frequently use R-600a as a refrigerant. Large commercial and industrial compressors may use R-170, R-290, and R-600a as demand increases. Centrifugal or hermetic air conditioners may use R-600a, R-290, or both. When compared to R-134a, a mixture of 50% R-290 and 50% R-600a provides better refrigeration performance while using less energy.

Conclusion

An old-fashioned natural refrigerant with the lowest effective GWP and zero ODP is carbon dioxide (CO_2). It is abundantly present in the air, heavier than air, non-toxic, non-flammable, and a byproduct of numerous industrial applications. Due to its lower operating pressures, it was used in marine applications prior to 1950 before being replaced by synthetic refrigerants. Cheap and having a low liquid density, R-744 allows for smaller systems and charges. Lowest boiling point, high critical temperature, and moderate critical pressure refrigerants are required for modern refrigeration and air conditioning requirements. At very low critical temperatures, R-744 has a refrigeration capacity that is more than 5.8 times greater. The CO_2 gas's trans-critical property yearns for supercritical pressure to reject heat. In the majority of refrigeration and heating applications, it is utilised in the trans-critical regime.

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Conflict of Interest

There is no conflict of interest by author.

References

1. Yang, Sheng, Yu Qian, Yifan Wang and Siyu Yang. "A novel cascade absorption heat transformer process using low grade waste heat and its application to coal to synthetic natural gas." *Appl Energy* 202 (2017): 42-52.
2. Haddad, Shamila, Paul Osmond and Steve King. "Revisiting thermal comfort models in Iranian classrooms during the warm season." *Build Res Inf* 45 (2017): 457-473.
3. Guo, Hongshan, Eric Teitelbaum, Nicholas Houchois and Michael Bozlar, et al. "Revisiting the use of globe thermometers to estimate radiant temperature in studies of heating and ventilation." *Energy Build* 180 (2018): 83-94.
4. Hrnjak, P. "Thermodynamic possibilities and technological opportunities for improving the science of refrigeration in search for low global warming thermal systems." In International Symposium on Next-generation Air Conditioning and Refrigeration Technology (2010).
5. Sovacool, Benjamin K., Steve Griffiths, Jinsoo Kim and Morgan Bazilian. "Climate change and industrial F-gases: A critical and systematic review of developments, sociotechnical systems and policy options for reducing synthetic greenhouse gas emissions." *Renewable Sustainable Energy Rev* 141 (2021): 110759.
6. Schick, Suzaynn F., Kathryn F. Farraro, Charles Perrino and Mohamad Sleiman, et al. "Thirdhand cigarette smoke in an experimental chamber: Evidence of surface deposition of nicotine, nitrosamines and polycyclic aromatic hydrocarbons and *de novo* formation of NNK." *Tob Control* 23 (2014): 152-159.

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