PERSPECTIVES OF THE INTEGRATION OF AN ABSORPTION REFRIGERATION CYCLE IN ENERGY PRODUCTION SYSTEM

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Abstract

Global warming and ozone depletion issues have had an impact on novel approaches of integrating some of the energy production systems. In present, fossil fuels such as oil, coal and natural gas still are the primary sources of energy used to provide the majority of the cooling requirements in vapor compression systems. In addition, this high energy-consumption systems work with substances that contribute to ozone layer depletion and are typically based on fluorinated gases (F gases), that as well, can have a global warming impact thousands of times greater than CO_2. Much research has been done on reuse and waste heat utilization within different systems to achieve a reduction in high carbon fuel consumption. The method that aims at improving the value of the exergy of the available renewable energy sources is the absorption refrigeration cycle (ARC). With ARC, the concept of "cooling with the heat" can be achieved, with a variety of benefits such as integration of the energy production systems, implementation of sustainable based technology in the industry of cooling, the possibility of establishing a district cooling system, etc. The cooling demands can be met through utilization of solar radiation, energy from biomass, waste heat from industrial processes, geothermal energy.

In the terms of the importance of low-temperature heat sources and the reuse of heat energy, currently present researches have focus on identifying engineering and cost-effective approaches to enhance the efficiency of an integrated system. That kind of system affects the output parameters of energy production and energy consumption, so the possibilities to compare the different systems from the exergy and economic standpoint, based on the different parameters are vast. The criteria of comparison and investigation the effects of integrated systems in majority of cases would be based on: better performance at very low temperatures, carbon dioxide emissions and cost savings. Despite the existence of different obstacles, the integration of different energy production systems will have a considerable impact when it comes to overcoming the challenges in the energy sector.

Keywords

Absorption refrigeration cycle, system integration, renewable energy, low-temperature sources