Solar System Peltire Module Refrigeration

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Abstract :

Solar refrigeration systems have gained significant attention in recent years as an environmentally friendly and sustainable alternative to conventional refrigeration techniques. The concept of harnessing the Peltier effect, which involves the use of thermoelectric modules, offers an innovative approach to cooling and refrigeration powered by solar energy. This abstract provides an overview of our research, which focuses on the development and optimization of a solar refrigeration system based on the Peltier effect for potential applications in a variety of settings, including domestic and off-grid scenarios.

Key words : By simply colling the Peltier module by solar battery

INTRODUCTION:

Solar energy is the most low cost, competition free, universal source of energy as sunshine's throughout. This energy can be converted into useful electrical energy using photovoltaic technology. Thermoelectric heating (or cooling) technology has received renewed interest recently due to its distinct features compared to conventional technologies, such as vapour-compression and electric heating (or cooling) systems. Thermoelectric (TE) modules are solid-state heat pumps (or refrigerators in case of cooling) that utilize the Peltier effect between the junctions of two semiconductor.

The TE modules require a DC power supply so that the current flows through the TE module in order to cause heat to be transferred from one side of the TE

module to other, thus creating a hot and cold side [2, 3]. The main objective of the heating & cooling system service is to be suitable for use by the people who live in the remote areas of country where load shading is a major problem.

IDENTIFIED ISSUES:

The most common failure mechanism of Peltier modules is mechanical fracturing of the semiconductor pellets or the associated solder joints. These fractures initially do not propagate completely through the pellet or solder joint and can be detected by a rise in the series resistance of the device.

1. The minimum temperature is -60C.
2. The maximum delta T is 380C.

LITERATURE REVIEW:

Kshitij Rokde, Mitali Patel , Tushar Kalamdar, Radha Gulhane , Rahul Hiware has work on thermoelectric refrigeration system running on solar energy and development of mathematical formulae and their study showed about Mathematical and theoretical characteristics of thermoelectric module the experimental capacity of refrigerator using two Peltier plate and heat sink module beside the plaiter plate to element the maximum number of heat from hot side of plate as per analysis result decreased the temperature is up to 14 °C temperature for 7 hours.
Hazim Moriaa, Munner Ahmeda, Ashraf Alghanmia, Taib Iskandar Mohammad, Yusli Yaakob are found in thermoelectric cooling systems, and are achieved to cool the minimum temperature to heat the minimum temperature. Instead of using a compressor refrigerator, using a solarbased refrigerator has many benefits, includ ing savings in the environment, cost and health.

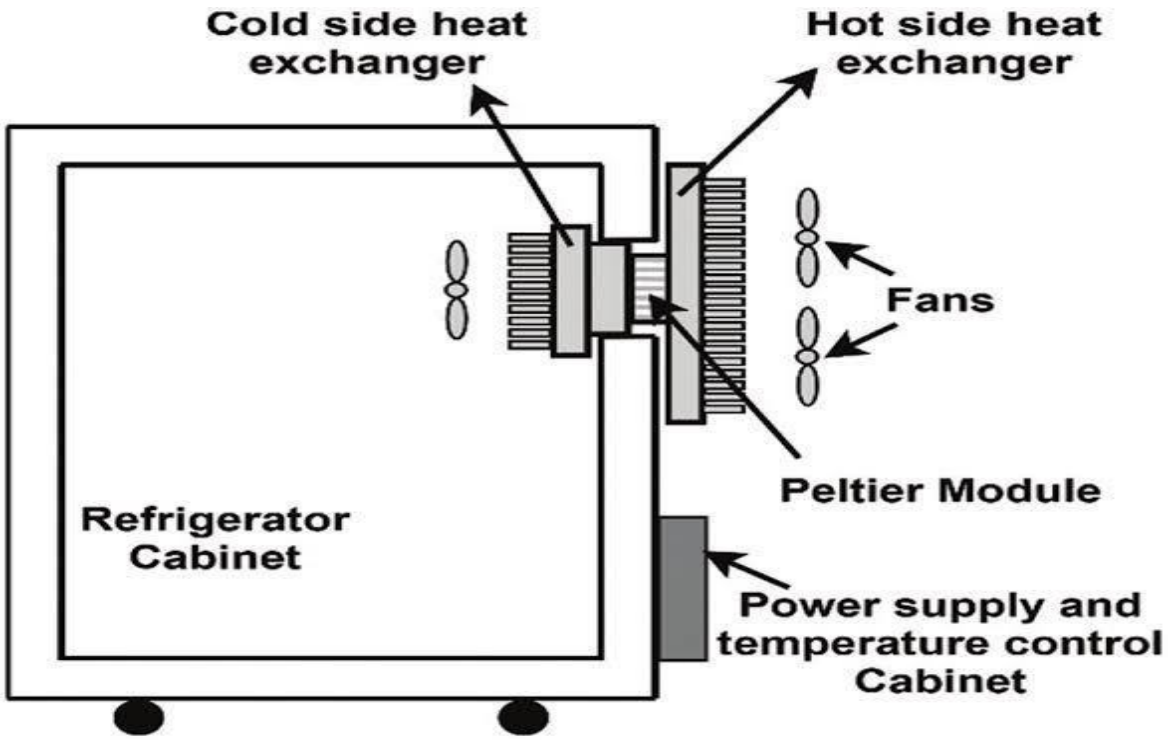
Abhijith Raju, Ajeesh J, Akash S., Akhil T J, Vishnu Bose, Jinshah B S You have come to the conclusion that the thermoelectric refrigerator results show that the ser vice is optimal for certain operating conditions. A temperature drop of 15 °C with 500 mL of water in the cooling area was discovered experimentally at 50 min at a

point of 27 °C ambient temperature. The calculation COP for the thermoelectric refrigerator was also 0.17. It was also experimentally discovered that the developed thermoelectric cooling system works continuously for 15 hours when the battery is fully charged with solar panels.

METHODOLOGY:

When electricity is passed through the module, electrons move in one element and positive holes move in the other element, this is called the "Peltier effect." This allows one side of the substrate to absorb heat and the other to radiate heat, so the hot and cold sides to be switched depending on the current direction.

1. When an electric current passes through a Peltier module, electrons move in one element and positive holes move in the other.
2. This causes one side of the module to absorb heat and the other to radiate heat.
3. The hot and cold sides can be switched by reversing the direction of the current.



APPLICATIONS:

The Peltier module is also used to accurately control the temperature of various analytical devices such as hematology analyzers, PCR, and Kyocera's furry modules a suitable for these areas that require ahighquality level, as they have longer properties with a high level of total assets.

CONCLUSIONS :

This insulation design contributed to the overall efficiency and effectiveness of the solar cooling system. In summary, solar cooling projects using Peltier modules the illustrate the possibilities and possibilities of using renewable energy sources for cooling applications.

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