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Short Communication

The Mechanism of Heat Transfer on Thermal Energy Exchanger

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DESCRIPTION

Thermal energy can be exchanged between objects by applying heat transfer processes. These techniques all operate under the underlying fundamental idea that heat and kinetic energy seek equilibrium or equal energy states. Conduction, convection, and radiant heat-often referred to as radiation, but it's a broader phrase that encompasses a wide range of phenomena-are the three main mechanisms by which heat can be transferred. Evapotranspiration is a connected process that radiates latent heat [1].

Heat transfer is the process of energy exchange between two systems or objects, which can occur through three mechanisms: conduction, convection, and radiation. Thermal mechanisms play a crucial role in all of these heat transfer processes [2].

Conduction

Conduction is the transfer of heat through a material due to molecular collisions between adjacent molecules. The rate of heat transfer by conduction is directly proportional to the temperature gradient (the difference in temperature between two points) and the thermal conductivity of the material. Materials with higher thermal conductivity, such as metals, transfer heat more quickly than materials with lower thermal conductivity, such as insulators [3].

Convection

Convection is the transfer of heat by the movement of a fluid, either a gas or a liquid. In natural convection, the movement is caused by the density differences due to temperature gradients. In forced convection, the movement is induced by an external force, such as a fan or pump. The rate of heat transfer by convection is proportional to the heat transfer coefficient, which depends on the fluid properties and the geometry of the system [4].

Radiation

Radiation is the transfer of heat through electromagnetic waves, without the need for a medium to transfer the energy. All objects emit and absorb radiation, and the rate of heat transfer by radiation is proportional to the fourth power of the temperature difference between the objects. The emissivity of an object determines how efficiently it emits radiation, while the absorptivity determines how efficiently it absorbs radiation [5].

In summary, thermal mechanisms are essential in heat transfer, and understanding them is crucial for designing and optimizing thermal systems [6].

Applications

Thermal mechanisms have a wide range of applications in various fields, including:

Heat engines: Thermal mechanisms are used in the design and operation of heat engines, such as internal combustion engines and steam turbines, to convert thermal energy into mechanical energy.

HVAC systems: Heating, Ventilation, and Air Conditioning (HVAC) systems use thermal mechanisms to regulate temperature and humidity in indoor environments.

Cooking: Thermal mechanisms are used in cooking appliances, such as ovens, stovetops, and grills, to transfer heat to food and cook it.

Metallurgy: Thermal mechanisms are used in metallurgy to heat and cool metals to achieve desired properties such as hardness, ductility, and strength.

Solar energy: Solar thermal mechanisms use sunlight to generate heat, which can then be used to generate electricity or for heating purposes.

Refrigeration: Thermal mechanisms are used in refrigeration systems to transfer heat from a low-temperature environment to a high-temperature environment, cooling the low-temperature environment in the process.

Industrial processes: Thermal mechanisms are used in various industrial processes, such as drying, sterilization, and curing of materials, to achieve specific temperature and humidity conditions.

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Medical applications: Thermal mechanisms are used in medical applications, such as hyperthermia treatment for cancer and cryotherapy for treating skin conditions and injuries.

CONCLUSION

For the direct use of solar energy, various techniques have been devised. The two that are the most well-known are industrial microalgae farming and solar cells. In addition, high-temperature thermo - chemical reactors have been under development for decades. These reactors run on concentrated solar radiation and produce hydrogen, among other things, for use in energy and clean transportation. For academics, studying and simulating coupled heat transfer in solar reactors presents a variety of challenging and intriguing issues.

REFERENCES

1. Taylor RA, Phelan PE, Otanicar T, Prasher RS, Phelan BE. Socioeconomic impacts of heat transfer research. Int J Heat Mass Transf. 2012;39(10):1467-1473.
2. Mojiri A, Taylor R, Thomsen E, Rosengarten G. Spectral beam splitting for efficient conversion of solar energy-A review. Renew Sustain Energy Rev. 2013;28:654-663.
3. Taylor RA, Phelan PE, Otanicar TP, Walker CA, Nguyen M, Trimble S, Prasher R. Applicability of nanofluids in high flux solar collectors. J Renew Sustain Energy. 2011;3(2):023104.
4. Trim D, Durst F. Combustion in porous medium–advances and application. Combust Sci. and Tech. 1996;121:153-168.
5. Kim SH, Huh KY, Dally B. Conditional moment closure modeling of turbulent nonpremixed combustion in diluted hot coflow. Proc Combust Inst. 2005;30(1):751-757.
6. Krishnamoorthy G, Sami M, Orsino S, Perera A, Shahnam M, Huckaby ED. Radiation modelling in oxy-fuel combustion scenarios. Int J Comut Fluid Dyn. 2010;24(3-4):69-82.