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A Critical Review on Thermoacoustic Refrigeration and its Significance

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Abstract:Conventional refrigeration system is being used widely for cooling purposes using various chemical refrigerants currently. However, this present scenario poses a major threat to the environment as the emission of harmful gases like ChloroFluoro Carbon (CFC), Hydro ChloroFluoro Carbon (HCFC) are on the rise due to the excess use of chemicals, and the requirement for refrigeration system is increasing. Hence, there is a necessity to find an alternative to conventional refrigeration. Thermoacoustic refrigeration system is one of the harmless types of refrigeration system, which offers a wide range of scope for further research. Some key advantages include no emission of harmful ozone depleting gases as chemical refrigerants are not required and the presence of no moving parts. The major disadvantage of the method is lesser Coefficient of Performance. This field is gathering the attention of many researchers as it combines both the disciplines of thermal and acoustics. Researchers have found the influence of various parameters of the components, the working fluid, and the geometry of the resonator on the performance of the device. Simulations using software are also being developed from time to time. The main objective of this paper is to present a detailed overview on the arrangement and functioning of the refrigeration system using high intensity sound waves. A review on the works done in this area, the advancements made and the future scope are also discussed.

Keywords:Refrigeration, No refrigerants or chemicals, Acoustics, Stack, Sound waves, Cooling, Temperature Difference.

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