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SUPERCRITICAL CO2 BASED POWER GENERATION FOR RED PLANET

Abstract

The Martian environment experiences an abundance in the amount of Co2 as well as solar energy. This availability of the aforementioned resources paves the way for a new era of power generation. As we plan to make Mars habitable, the first step for establishment of any kind of facilities over there is to create a power source capable of operating under Martian conditions. Scope of this paper covers the generation of power at the Martian atmosphere for supporting life with minimum cost, more weight to power ratio, higher efficiency and being environment friendly. The supercritical C02 (S-Co2) Brayton cycle has recently been gaining a lot of attention due to its compactness, efficiency and being environment friendly for the next generation solar power. Supercritical Co2 Brayton cycle will absorb heat through direct solar plate and rise the temperature of Co2 gas. Which ultimately reaches the supercritical temperature of Co2 (304 K). Due to the property of Co2, gas near the supercritical regime will have a higher density as compared to normal gas and it will take very less amount of work. Further, the increase in temperature will improve the net work done by the plant. As compared to normal Bryton cycle, size of the plant is reduced by more than 50Against the backdrop of energy conservation and emission reduction, the development of power generation technology has always been focusing on higher efficiency with lower cost, whereas using renewable energy source or abundant heat is one of the solutions. Since solar energy is readily available at mars, will give an exhaustive solution to the power generation need as compared to any other power source. The sCo2 Brayton cycle utilizing solar power gives a unique cost effective solution for Martian life in future. This paper mainly focuses on the overall system optimization from receiving solar heat to generating power.