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PERFORMANCE EVALUATION OF ELECTRICITY GENERATION SYSTEMS BASED ON SEMICONDUCTOR THERMOELECTRIC GENERATORS FOR HYPERSONIC VEHICLES

Abstract

The types and the characteristics of the waste heat on hypersonic vehicles and the application feasibility of thermoelectric generators (TEGs) for hypersonic aircrafts were discussed in this paper. Two thermoelectric generator models with isothermal heat source and variable temperature heat source were developed to predict the performance of the electricity generation systems on a hypersonic vehicle with different heat source. The thermoelectric efficiency variation with electric current, the temperature distribution of fuel and junctions, and the distribution of the thermoelectric figure of merit (ZT value) were described by diagrams. Besides, some improvements for a better performance were analyzed. The results indicate that the maximum values of thermoelectric efficiency are 5