

A Second Law Assessment of Organic Rankine Cycle Depending on Source Temperature

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Abstract : Organic Rankine Cycle (ORC) has potential in reducing fossil fuels and relaxing environmental problems. In this work performance analysis of ORC is conducted based on the second law of thermodynamics for recovery of low temperature heat source from 100°C to 140°C using R134a as the working fluid. Effects of system parameters such as turbine inlet pressure or source temperature are theoretically investigated on the exergy destructions (anergies) at various components of the system as well as net work production or exergy efficiency. Results show that the net work or exergy efficiency has a peak with respect to the turbine inlet pressure when the source temperature is low, however, increases monotonically with increasing turbine inlet pressure when the source temperature is high.

Keywords : Organic Rankine Cycle (ORC), low temperature heat source, exergy, source temperature

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