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A supercritical power cycle using carbon dioxide for low temperature geothermal sources

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The wide utilization of renewable energy can relieve current energy crisis effectively. Supercritical Rankine cycle using carbon dioxide as working fluid can be adopted to recover low-temperature geothermal energy. In the study, a thermodynamic model is set up firstly to study the performance of a supercritical Rankine cycle using carbon dioxide as working fluid for low-temperature geothermal source. Then, the effects of the evaporating pressure and temperature on the systematic efficiency are analyzed. The results show that the thermal efficiency increases first and then decreases as the evaporation pressure ascends and there exists an optimal evaporation pressure whose efficiency is maximized. In addition, the system efficiency rises as the evaporating temperature rises. The highest thermal efficiency achieves at 9.53% when the evaporating pressure and temperature are 2.8MPa and 380K, respectively. This study can provide some theoretical guidance for the application of supercritical Rankine cycle system with CO_2 in the future.

Biography

Enhua Wang is an associate professor of the Department of Energy and Power, School of Mechanical Engineering, Beijing Institute of Technology since 2016. He got his bachelor and master degrees from Tsinghua University (China) in 2000 and 2003. After that, he worked at the Beijing Automotive Technology Center for several years. In 2013, he received his PhD degree from Beijing University of Technology. Then he got a postdoctoral fellowship at the State Key Laboratory of Automotive Safety and Energy, Tsinghua University. In 2015, he worked at Glasgow University (UK) as a Research Associate for one year. His research interest includes organic Rankine cycle technology, simulation and control of power system such as internal combustion engine, and hybrid-electric powertrains. He has published over forty papers and held thirteen patents.

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