



energies



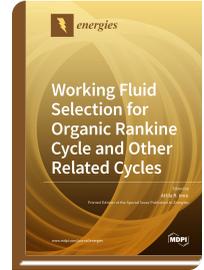
Special Issue Reprint

Working Fluid Selection for Organic Rankine Cycle and Other Related Cycles

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The world's energy demand is still growing, partly due to the rising population, partly to increasing personal needs. This growing demand has to be met without increasing (or preferably, by decreasing) the environmental impact. One of the ways to do so is the use of existing low-temperature heat sources for producing electricity, such as using power plants based on the organic Rankine cycle (ORC). In ORC power plants, instead of the traditional steam, the vapor of organic materials (with low boiling points) is used to turn heat to work and subsequently to electricity. These units are usually less efficient than steam-based plants; therefore, they should be optimized to be technically and economically feasible. The selection of working fluid for a given heat source is crucial; a particular working fluid might be suitable to harvest energy from a 90 °C geothermal well but would show disappointing performance for well with a 80 °C head temperature. The ORC working fluid for a given heat source is usually selected from a handful of existing fluids by trial-and-error methods; in this collection, we demonstrate a more systematic method based on physical and chemical criteria.



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