

Thermodynamic Analysis of Ammonia-Water Based Regenerative Rankine Cycle with Partial Evaporation

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Abstract : A thermodynamic analysis of a partial evaporating Rankine cycle with regeneration using zeotropic ammonia-water mixture as a working fluid is presented in this paper. The thermodynamic laws were applied to evaluate the system performance. Based on the thermodynamic model, the effects of the vapor quality and the ammonia mass fraction on the system performance were extensively investigated. The results showed that thermal efficiency has a peak value with respect to the vapor quality as well as the ammonia mass fraction. The partial evaporating ammonia based Rankine cycle has a potential to improve recovery of low-grade finite heat source.

Keywords : ammonia-water, Rankine cycle, partial evaporating, thermodynamic performance

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