The Researches on Absorption Cycle for Power and Cooling Cogeneration

JIN, HongGuang

Inst. of Eng. Thermophysics, Chinese Academy of Science, Beijing 100190, China

ZHENG, DanXing

Coll. of Chem. Eng., Beijing University of Chem. Tech., Beijing 100029, China

Abstract:

In the utilizations of process waste heat and solar energy, the lower temperature quality and uncontinuous problems exist. To use low-grade heat, Kalina(1980) proposed an absorption power cycle by ammonia-water mixture as working fluid. Afterward, Gosmami et al(1995) and Kashiwagi et al(1997) successively proposed absorption cycles for power and cooling cogeneration. Except the heat recovery, the proposals even considered purposes of power/cooling demand control for relative facilities and users, and energy storage to balance the gird-electricity supply between the day and night.

The presentation will exhibit the author's theoretical and experimental researches on the ammonia-water absorption cycles for power and cooling cogeneration in previous decade, in which a project "*Research of Multitarget Cycle Using Non-Azeotriopic Mixture and Low-temperature Heat Source*" was supported by NSFC.

The new cycles proposed by means of the system integration or process retrofitting on the basis of Kalina cycle, have two running modes, i.e. pure power generation and power and cooling cogeneration, and can be driven by low-grade heat directly or by the exhaust form gas turbine as that as a bottoming cycle in a distributed energy supply system.

The cycle configuration, i.e. the subcycle coupling approaches of power generation, refrigeration, absorption and regeneration of circulating solution; the thermodynamic mechanism of energy transportation and conversion; the key parameters and cycle performances, cycle experiments on the turbine expansion and ammonia-water refrigeration, etc were investigated respectively.

Keywords:

low-grade heat utilization; absorption cycle; power and cooling cogeneration; thermodynamics analysis; system energy integration; Kalina cycle; ammonia and water; ammonia turbine