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热能工程

# 整体煤气化联合循环三压再热底循环系统变工况特性

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摘要： 采用ThermoFlex软件建立了200 MW级整体煤气化联合循环(integrated gasification combined cycle，IGCC)系统模型，研究三压再热流程的IGCC底循环系统变工况特性。详细讨论了燃气轮机负荷、大气温度和整体空分系数对底循环系统性能的影响。结果表明：燃气轮机采用调节压气机进口可转导叶角度－等燃气透平初温的调节方式降负荷时，随燃气轮机负荷降低，主蒸汽温度和再热蒸汽温度先升高后降低，关小压气机进口导叶角度可抑制高压汽包压力的下降，同时使汽轮机低压缸排汽干度上升，有利于提高底循环系统的变工况性能。随大气温度升高，高压汽包压力、高压缸进汽量和底循环功率均降低，而主蒸汽温度和汽轮机低压缸排汽干度升高。降低整体空分系数可以大幅度提高底循环系统功率，但导致汽轮机低压缸排汽干度缓慢降低。

关键词： 整体煤气化联合循环 三压再热 底循环系统 变工况特性

# Off-design Characteristics of Three-pressure With Reheat Bottom Cycle System in Integrated Gasification Combined Cycle

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Abstract: The model of 200 MW integrated gasification combined cycle (IGCC) system was established by the software “ThermoFlex”. The off-design characteristics of three-pressure with reheat bottom cycle system in IGCC were studied and effects of gas turbine’s load, atmosphere temperature and air separation unit (ASU) integrated coefficient on characteristics of bottom cycle system were fully discussed. Results show that while in regulation manner of adjusting compressor inlet guide vanes (IGV) angle and keeping turbine inlet temperature (T3) constant to reduce gas turbine’s load, main steam temperature and reheat steam temperature are firstly increased and then declined. Closing IGV angle can restrain pressure of high-pressure vapor-bag decline, and make exhaust steam dryness of low-pressure steam turbine rise, so this is beneficial to improve off-design characteristics of bottom cycle system. As atmosphere temperature increasing, pressure of high-pressure vapor-bag, steam flow inlet high-pressure cylinder and power of bottom cycle system all decline, but main steam temperature and exhaust steam dryness of low-pressure cylinder in steam turbine increase. Decreasing Xas can greatly enhance power of bottom cycle system, but slowly reduce exhaust steam dryness of low-pressure cylinder in steam turbine.

Keywords: integrated gasification combined cycle (IGCC) three-pressure with reheat bottom cycle system off-design characteristic

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