

论文

整体煤气化联合循环系统变工况特性研究

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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, 从系统的角度出发计算研究了200 MW级IGCC系统的变工况特性。详细讨论了燃气轮机负荷、大气环境条件和整体空分系数对系统性能的影响。结果表明, 燃气轮机采用压气机进口可转导叶角度调节 - 等燃气透平初温的调节方式降负荷时, 燃气透平排气温度先增加后降低, 而系统效率先缓慢降低后快速降低。随大气温度增加, 燃气轮机功率、汽轮机功率和系统净功率均下降。在大气温度不变的条件下, 大气压力对燃气轮机效率和系统净效率基本没有影响。增加整体空分系数可提高系统净效率, 却使系统净功率降低。

关键词: 整体煤气化联合循环 变工况特性 燃气轮机负荷 整体空分系数 大气环境条件

Research on Off-design Characteristics of Integrated Gasification Combined Cycle System

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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 200 MW IGCC system were studied from the point of system and effects of gas turbine's load, atmosphere circumstance condition and air separation unit (ASU) integrated coefficient (Xas) on characteristics of 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, the variety trend of gas turbine exhaust temperature is firstly increased and then declined. System efficiency firstly declines slowly and then declines quickly as gas turbine's load reducing. Gas turbine power, steam power and system net power all decline as atmosphere temperature increasing. Atmosphere pressure almost has no effect on gas turbine efficiency and system net efficiency when atmosphere temperature is fixed. Increasing Xas can enhance system net efficiency and reduce system net power.

Keywords: integrated gasification combined cycle offdesign characteristic gas turbines load air separation unit integrated coefficient atmosphere circumstance condition

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