

工程热物理

R0110重型燃气轮机燃烧室污染排放性能研究

谢刚, 祁海鹰, 李宇红, 冯冲, 陈晓丽

清华大学热科学与动力工程教育部重点实验室

摘要: 我国研发的R0110重型燃气轮机采用干式低污染燃烧室设计。燃烧室具有2种工作模式, 为检验其排放性能, 在低压模拟条件下针对模式I进行了单管试验。结果表明, 在整个负荷范围内, NOx排放均远远超标; CO在负荷≥0.7后均满足设计要求; 当参照GE公司DLN燃烧室的设计特点降低值班燃料比例后, NOx反而增加。分析认为, NOx超标的原因主要是预混燃料比例偏低, 预混均匀性相对不足, 燃烧区过量空气系数的设计不合理, 致使燃烧温度偏高。值班燃料的负面影响是由于原始设计使局部形成了富燃料燃烧的状态。针对以上问题, 提出了进一步改善燃烧室的污染排放特性的措施建议。

关键词: R0110重型燃气轮机 干式低污染燃烧室 径向分级 污染排放

Emission Performance of the Dry Low NOx Combustors for R0110 Heavy-duty Gas Turbine

XIE Gang, QI Hai-ying, LI Yu-hong, FENG Chong, CHEN Xiao-li

Key Laboratory for Thermal Science and Power Engineering of Ministry of Education, Tsinghua University

Abstract: The R0110 heavy-duty gas turbine was researched and developed with the design of the dry low NOx combustor, which has two working modes. Under mode I, low pressure experiments were conducted to test the combustor's emission performance. Results showed that the NOx emission badly exceeds the standard over the entire load range; while the CO emission meets the design requirement after the load value exceeding 70% load. Test results also indicated that the NOx emission might even be increased when the pilot fuel ratio is reduced in accordance with the design characteristic of GE dry low NOx combustor system. Reasons for the exceeding of NOx emission over the design specification can be concluded as the relative low premixed fuel ratio; the poor fuel/air mixed quality; and the unreasonable excess air coefficient in the combustion zone. The negative effect of the pilot fuel on the NOx emission is resulted from the fuel rich state in local zones. Future work on improving the performance of pollutant emissions was presented in the end.

Keywords: R0110 heavy-duty gas turbine dry low NOx (DLN) combustor radial staging emissions

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通讯作者: 谢刚

作者简介:

作者Email: xieg@mails.tsinghua.edu.cn

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