

热能工程

外置瑞士卷多孔介质燃烧器贫燃试验

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摘要: 对一种新型外置瑞士卷多孔介质燃烧器的贫燃特性进行了试验研究, 对其点火预热启动过程及其不同预混气体浓度、流量等工况参数条件下的温度分布、排放特性进行了测量; 分析燃烧器的启动方法以及流量、预混气体浓度等有关工况参数对其燃烧特性的影响规律。结果表明, 燃烧器冷启动时甲烷氧化率较低, 有大量的CO生成; 由于多孔介质的存在, 燃烧器整体升温较慢, 无局部高温, NOx生成量较小; 在相同预混气甲烷浓度条件下稳定燃烧时, 此类型燃烧器相对无瑞士卷结构的多孔介质燃烧器, 在同一预混气甲烷浓度条件下对流量具有较好的适应性, 火焰稳定性好; 预混气甲烷浓度越大、驻留时间越长、燃烧温度越高, 甲烷氧化率也越大。

关键词: 瑞士卷 多孔介质燃烧器 贫燃 氧化率

Experiment on Lean Fuel Combustion in Porous Media Combustor With External Swiss-roll

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Abstract: An experimental study was carried out on the startup and lean combustion characteristics of a new type porous media combustor with external Swiss-roll (SRPC). The temperature profiles and pollutant emission were measured in the startup process of preheating by ignition, and at various working parameters including fuel concentration and gas flow rate. The influences of the major parameters on the combustion characteristics of SRPC were analyzed. The results show the burn-out rate of methane in the premixed gas is lower in the cold startup process of SRPC and the amount of carbon monoxide in the exhaust is bigger. The total temperature increases very lowly and there is no local high temperature zoon because of the existence of porous media in the combustion zoon of SRPC for reason that the amount of NOX production is low. In the situation of stable combustion, the SRPC has higher efficiency wide range of adjustment and better flame stabilization than the combustor without Swiss-roll structure in the condition of the same methane concentration of premixed gas. The burn-out rate of methane increases with the increase of the concentration of methane/air mixture, residence time, and the combustion temperature.

Keywords: Swiss-roll porous media combustor lean combustion burn-out rate

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