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火花点燃对乙醇HCCI燃烧稳定性的影响

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摘要 针对实现均质压燃（HCCI）燃烧的难点之一：着火和燃烧的控制，在一台由柴油单缸机改造而成的乙醇燃料HCCI燃烧单缸试验机上实现了HCCI燃烧，研究了火花点燃对HCCI燃烧稳定性的影响。结果表明：HCCI燃烧方式的燃烧循环变动比火花点火燃烧低，燃烧速度快，热效率高，NO_x的排放大幅降低。在HCCI临界温度工况下引入火花辅助点燃能提高燃烧稳定性，减少失火循环的产生；随着缸内温度逐渐高于混合气的临界着火温度，火花点燃对HCCI燃烧的影响逐渐减弱。

关键词 动力机械工程 乙醇 火花点燃 均质压燃 燃烧稳定性 燃烧稳定性

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Effect of spark ignition on homogeneous charge compression ignition combustion stability of ethanol

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Abstract The control of the ignition and combustion phases is one of the main difficulties in the homogeneous charge compression ignition(HCCI) combustion. The HCCI combustion of ethanol was realized in a test engine modified from a series produced single-cylinder diesel engine and the effect of the spark ignition(SI) on the HCCI combustion stability was investigated. The results show that the combustion rate and the thermal efficiency in the HCCI combustion are higher than those in the SI combustion, being accompnied by a remarkable reduction of the NO_x emissions and the cyclic variation of combustion. At the critical temperature operation conditions, introduction of the SI improves the HCCI combustion stability and reduces the misfire rate. As the temperature rises above the critical, the effect of the SI on the HCCI combustion decreases.

Key words power machinery and engineering ethanol spark ignition(SP) homogeneous charge compression ignition（HCCI） combustion stability

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