

## 醇类添加剂改善HCCI发动机高负荷爆震试验

何超 许金花 纪常伟 何洪

北京工业大学

**关键词:** 均质预混合压燃发动机 醇类燃料 爆震 添加剂

**摘要:** 在基础燃料(PRF90)中添加少量甲醇和乙醇,研究醇类添加剂对HCCI发动机爆震的影响。试验燃料含甲醇和乙醇体积分数分别为1%、3%、5%,在一台改造过的四缸柴油机的第4缸进行HCCI燃烧试验。试验结果表明,在发动机转速为1400r/min、相同循环喷油量的稳态工况下,随着甲醇和乙醇体积分数的增加,燃烧缸压和放热率峰值逐渐降低,燃烧持续期逐渐增加,爆震得到有效抑制,负荷范围得到拓宽。在较小的体积分数下,甲醇和乙醇的抗爆能力接近,甲醇略优于乙醇,随着体积分数的增加,优势加大。含醇燃料的失火界限比基础燃料窄,HCCI发动机失火可能性增加,兼顾爆震与失火性能,甲醇或乙醇的体积分数应在1%左右。The effects of methanol and ethanol additives on homogeneous charge compression ignition (HCCI) engine knock were investigated by add small quantity of methanol and ethanol to the base fuel (PRF90). Six test fuels were confected with the volume fractions of 1%, 3% and 5% containing methanol and ethanol, respectively. HCCI combustion tests were conducted on the fourth cylinder of a modified 4-cylinder diesel engine. The experimental results showed that, under steady engine speed of 1400r/min and at the same fuel injection quantity per cycle, with the increase of the volume fractions of methanol and ethanol added, the peak values of HCCI combustion cylinder pressures and heat release rates decreased gradually, causing combustion duration increased, knock effectively controlled, and load range enlarged. At the small volume fraction, methanol is better than ethanol in controlling engine knock, and methanol is much better than ethanol with the increase of the volume fraction. However, the misfire limits for the fuels containing methanol and ethanol are narrower than that for the base fuel, resulting in more possibility of engine misfire. For the tradeoff of knock and misfire, the volume fraction of methanol or ethanol in the base fuel needs to be about 1%.

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