

柴油机燃用柴油/乙醇混合燃料的性能与排放研究

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摘要: 为了给柴油/乙醇混合燃料的应用提供试验和理论依据,进行了柴油机燃用柴油/乙醇混合燃料的性能与排放研究. 研究表明:随着燃料中乙醇掺混比例的增加,有效燃油消耗率有所增加,但当量柴油有效燃油消耗率降低,有效热效率增加;在掺混比例较高时,需要添加十六烷值改进剂提高混合燃料的十六烷值;在同一工况下,发动机排气烟度随乙醇的加入而减少,NO_x排放则无明显的增加;排气烟度的下降率随含氧量的增加而增大,未添加十六烷值改进剂时升高的幅度小于添加十六烷值改进剂后. 减小供油提前角,NO_x排放下降,排气烟度增加.

关键词: 乙醇;排放;柴油机

中图分类号: TK411.2 **文献标识码:** A **文章编号:** 0253-987X(2007)03-0285-06

Study on the Performance and Emissions of a Direct Injection Diesel Engine Fuelled with Diesel/Ethanol Blends

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Abstract: In order to provide the theory and experimental basis for engine operating on the oxygenated fuels, combustion characteristics and emissions of direct injection diesel engine operating on the diesel/ethanol blends were investigated. The results show that the brake specific fuel consumption increases with the increase of ethanol fraction in the blends. However, the diesel equivalent brake specific fuel consumption decreases and the thermal efficiency increases with the increase of ethanol fraction in the blends. In the case of high ethanol fraction in the blends, the addition of the cetane number improver is favorable to the increase of the cetane number of the blends. For the same brake mean effective pressure and fuel delivery advance angle, the exhaust smoke decreases with the increase of ethanol fraction in the blends, while NO_x shows little variation with the addition of ethanol in the blends. The exhaust smoke reduction rate increases with the increase of the oxygen fraction in the blends. The exhaust smoke reduction rate of the blended fuels without cetane number improver is lower than that of those with cetane number improver. The exhaust smoke increases and NO_x decreases with the decrease of the fuel delivery advance angle.

Keywords: ethanol; emissions; diesel engine

与汽油机相比,柴油机拥有较高的热效率和更广阔的应用范围,这使得很多研究者们长期致力于提高柴油机性能的研究. 然而,柴油机的发展却始终受着排放问题的制约. 由于近年来人们环保意识的

进一步加强以及排放法规的逐渐严格,减小柴油机的排放已成为一个主要的研究方向.

减少柴油机排放的难点主要集中在 NO_x 和碳烟的控制上,一般在减小其中一项的同时会导致另