米糠油生物柴油-水乳化油的稳定性及燃料性能

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关键词： 米糠油 柴油 生物柴油 乳化 燃料性能 稳定性

摘 要： 采用乳化技术制备生物柴油-水乳化燃料，并对乳化液稳定性的影响因素，以及W/O和O/W/O乳化油的燃料特性和排放情况进行了实验研究。实验结果表明乳化剂加入量0.5%，温度30℃，乳化剂HLB值为13时乳化液稳定性最好，HLB值为6时稳定性最差，在O/W/O乳化油中的分层情况也最为明显。乳化液的动力学粘度、体积质量和残碳量均高于生物柴油。W/O乳化油比O/W/O乳化油的平均液滴尺寸小、分散相体积分数小，扣除其中水的热量，其热值高于纯生物柴油和O/W/O乳化油。乳化油的燃油消耗率高于生物柴油和普通柴油，CO排放量低于普通柴油，但高于生物柴油，而NOx排放量低于生物柴油和普通柴油。 The emulsification technology was applied to prepare two-phase W/O and three-phase O/W/O biodiesel emulsions. The effects of emulsifier dosage, temperature, HLB value on the emulsion stability, fuel properties of emulsion and emission were investigated by experiment. The experimental results showed that emulsifier dosage 0.5%, temperature 30℃ and surfactant mixture when aHLB＝13 produced the highest emulsification stability, while aHLB＝6 produced the lowest stability and the most significant extent of water-oil separation among the various HLB values for O/W/O emulsion. In addition, it was found that the W/O emulsion had a smaller mean droplet size and lower volumetric fraction of the dispersed phase than those of O/W/O emulsion respectively, and the heating value is higher than that of O/W/O emulsion and neat biodiesel if water content was deducted from the calculation of the heating value. The brake specific fuel consumption of emulsions was higher than that of neat biodiesel and diesel. CO emissions of emulsions were higher than those of neat biodiesel, but were lower than those of diesel. NOx emissions of emulsions were lower than those of biodiesel and diesel.

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