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混合动力汽车发动机快速起动瞬态排放研究

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摘要

本文介绍了用于混合动力汽车动力系统的发动机快速起动模拟试验台架系统和相关试验。针对一台进气道喷射式的汽油机，模拟起动/发电一体化电机，

研究了在不同拖动转速下快速起动过程的瞬态特性和排放特性。试验结果表明：发动机在快速起动情况下，瞬态特性突出；随着拖动转速升高，进气歧管压力降低，对应的喷油策略也应随之调整；在发动机起动后的第2~9循环，容易发生不完全燃烧和失火，并随着拖动转速升高，不完全燃烧程度增加，导致碳氢排放过高。在不同拖动转速下，三效催化剂都不能高效转化碳氢排放，但转化效率存在差异。随着拖动转速升高，

催化剂的转化效率先降低而后又升高。从优化排放角度来看，在本实验条件下，快速拖动至1000r/min起动时，催化剂后排放最低。

关键词 [混合动力](#) [快速起动](#) [燃烧与排放](#) [瞬态特性](#)

分类号

Transient Start Characteristics of the Combustion and Emissions under the Quick High Cranking Speed for Hybrid Electric Vehicles

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Abstract This paper presents a test bench which is constructed to simulate quick start of the engine for an Integrated Start/Generator (ISG) system of HEV and the transient processes characteristics of the combustion and emissions under the quick high cranking speed for a port-fuel-injected gasoline engine under various cranking speeds. The test results show that the engine start for a hybrid electric vehicle is much quicker and more transient than that for a normal vehicle. The intake manifold pressure is lower when the cranking speed enhanced, thus the fuel metering strategies should be modified. Incompletely combustion and misfire are more easily occur at the first 2~9 cycles during the start process. With the increase of cranking speed, incompletely combustion is more significant, which leads to higher hydrocarbon emissions. Under the start condition, the hydrocarbon emissions can not be converted completely, but the catalyst efficiency is different. When the cranking speed increased, the catalyst efficiency decreases firstly, then it increases again. Under the condition of this paper, the post-catalyst hydrocarbon emission is minimum when the cranking speed is set at 1000 r/min.

Key words [Hybrid Electric Vehicle](#) [Engine Quick Start](#) [Combustion and Emission](#) [Transient Characteristics](#)

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