عنوان مقاله:

Comparison of the Effects of Hydrogen and Hydroxygen Additions and Oxygen Enrichment on the Emission Characteristics of EF7 Engine

محل انتشار:

مجله انرژی تجدیدپذیر و محیط زیست, دوره 6, شماره 1 (سال: 1398)

تعداد صفحات اصل مقاله: 7

نویسندگان:

.Reza Rahimi - *Department of Mechanical Engineering, Najafabad Branch, Islamic Azad University, Najafabad, Iran*

Alireza Shirneshan - *Department of Mechanical Engineering, Najafabad Branch, Islamic Azad University, Najafabad, Iran|Aerospace and Energy Conversion Research Center, Najafabad Branch, Islamic Azad University, Najafabad, Iran.*

خلاصه مقاله:

In this study, the effects of hydrogen and hydroxygen additions and oxygen enrichment on the emission characteristics of a gasoline engine (EF7) were investigated and compared with each other. The simulation was launched by GT-Power at different engine speeds with 5 % to 15 % volume fractions for both of oxygen and hydrogen enrichment and 4.5 % to 9 % volume fractions of hydroxygen addition in the intake gas, respectively. In addition, the model was validated by experimental data. The results showed that CO emission decreased from 11 % to 28 % in the hydrogen-enrichment condition. Moreover, carbon monoxide production was reduced from 28 % to 42 % for hydroxygen addition, and this pollutant emission experienced a reduction of 51 % to 67 % for oxygen enrichment. According to the results, HC emission decreased up to 13% in the hydrogen-enriched air condition, and it was reduced from 30 % to 43 % during hydroxygen addition. In addition, HC emission experienced maximum reduction of 47 % to 68 % during oxygen addition. On the other hand, there was an opposite trend for NOx emission. It was observed that NOx emission increased by around 40 % and 75 % for hydrogen and hydroxygen enrichment, respectively. Moreover, nitrogen oxides enhanced 2 to 5 times during oxygen enrichment, compared to that in the normal condition of the engine. Results showed that 15 % oxygen enrichment and 9 % hydroxygen enrichment had significant effect on the reduction of HC and CO emissions, and oxygen enrichment had greater effect on the rise of .NOx emissions than hydrogen and hydroxygen additions

کلمات کلیدی:

hydrogen, Hydroxygen, Modeling, Emission, Enrichment