

عنوان مقاله:

Hydrogen and Ethanol as Potential Alternative Fuels Compared to Gasoline under Improved Exhaust Gas Recirculation

محل انتشار:

ماهنامه بین المللی مهندسی، دوره 27، شماره 3 (سال: 1392)

تعداد صفحات اصل مقاله: 8

نویسندگان:

m Mardi kolur - Department of Mechanical Engineering, University of Urmia, Iran

sh Khalilarya - Department of Mechanical Engineering, University of Urmia, Iran

s Jafarmadar - Department of Mechanical Engineering, University of Urmia, Iran

a Nemati - Department of Mechanical Engineering, Islamic Azad University, Miyaneh Branch, Iran

خلاصه مقاله:

In the present study, a computational fluid dynamics (CFD) method has been utilized to investigate the effects of exhaust gas recirculation (EGR) and initial charge pressure using a supercharger on the emissions and performance of a SI engine. This engine is fueled separately by gasoline and two potential alternative fuels, hydrogen and ethanol. The results of simulation are compared to the experimental data. There is a good agreement among the results. The calculations are carried out for EGR ratios between 0% and 20% and four cases of initial pressure have been mentioned: $P_{in} = 1, 1.2, 1.4, 1.6$ bar. The effect of EGR on NO_x emission of hydrogen is more than others while its effect on IMEP of hydrogen is less than others. From the viewpoints of emission and power, 10% of EGR seems to be the most desirable amount. The most noticeable effect of supercharging is on gasoline unlike hydrogen that seems to be affected the least. The comparison of results shows that hydrogen due to its high heating value and burning without producing any carbon-based compounds such as HC, CO and CO₂ is an ideal alternative fuel compared to other fuels.

کلمات کلیدی:

SI Engine, Hydrogen, Alternative Fuels, EGR, Supercharging, Emission

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