

A NUMERICAL STUDY OF ENHANCED AUTOIGNITION IN HCCI HYDROGEN FUELLED ENGINE

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Abstract: In internal combustion engine, the intermediate species left from the previous cycle can play an important role in the low-temperature autoignition of lean fuel–air charge during mixture compression. The objective of this study is to clear the effect of long-living and durable intermediate specie H_2O_2 on specific features of lean H_2 –air mixture autoignition by a numerical modeling approach using a well-known detailed chemical kinetic mechanism of H_2 –air oxidation. Chemically enhanced autoignition of H_2 –air in an HCCI (homogeneous charge compression ignition) internal combustion engine is also simulated. It is shown that the addition of small amounts of H_2O_2 at various compression ratios dramatically changes the pace of autoignition.

Keywords: numerical modeling; intermediate species; chemically enhanced autoignition

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