GASEOUS FUEL INJECTION AND AIR-FUEL MIXTURE FORMATION PROCESS IN A SIMULATED ENGINE INTAKE PORT

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Both hydrogen and natural gas are considered to be alternative fuel for internal combustion engines due to their favorable properties. In this study, the fuel injection and air-fuel mixture formation process of various gases and gaseous mixtures in the intake port of a PFI engine have been simulated in a transparent duct. Different air movements have been characterized firstly to simulate airflow in engine intake port under various conditions. The gas jet and air-fuel mixture formation process of several gases and gaseous mixtures (helium, nitrogen, and helium nitrogen mixture with different mixing portion, where helium simulates hydrogen and nitrogen simulates natural gas, respectively)) have been studied through results of schlieren imaging and PIV (Particle Image Velocimetry). Different injection strategies have been applied. Effects of gas properties and airflow movements on the gas jet development and air-fuel mixture formation process under different conditions have been analyzed in depth.