Characteristic Study of Two phase Unlike Impinging Injectors

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Abstract

The possibility of using two phase impinging injectors as an alternative for coaxial injector used in cryogenic or semi cryogenic engines is studied experimentally. In addition to simplicity of design and fabrication, the flexibity of spray shaping according to the need is possible with gas-liquid impingement. In the present study, water and air in appropriate proportions are used as simulants in place of commonly used liquid oxygen and hydrogen. The SMD values obtained in the case of gas-liquid impingent were found to be lower compared to the shear coaxial atomizer for the same mass ratios of water to air. Gas penetration through the liquid sheet at high gas pressures seems to constrain some of the geometric parameters in such injectors. This can be overcome by using larger gas orifice compared to liquid orifice and employing lower gas pressure drops. For characterizing the spray resulting from gas-liquid impingement, the ratio of normal gas momentum to liquid mass flow rate was identified as a suitable parameter.

Key words:
Rocket engine injector Spray, Impinging jets, SMD, gas penetration

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