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HYDROGEN BLENDING WITH OXY-COMBUSTION: COMBUSTION CHARACTERISTICS

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Abstract

Hydrogen blending is a promising method to improve burning characteristics of natural gas by turning it into a low-carbon-intensity fuel. The paper studies the concurrent impact on the combustion process of oxy-combustion and of hydrogen blending with natural gas, in terms of flame temperature and environmentally-harmful combustion products. Different percentages of oxygen-added combustion air up to 30 percent O2 are considered as the hydrogen fractions in fuel vary from zero, to 100%. The combustion computation algorithm developed by the authors considers dissociation and the output represents the flue gases temperature and composition in terms of mole fractions. The combustion air is considered in two hypotheses: without preheating, and with a preheating at 590 K. The study shows that the dependencies are rather complex, due to the multitude of variables involved.

Keywords: combustion characteristics, gaseous fuel, hydrogen blending, oxy-combustion

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