

Review of advances in the field of methane-hydrogen mixtures application in industrial gas turbines

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Recently, more and more materials have been published in Russia and abroad about renewable energy sources and the use of hydrogen instead of conventional (hydrocarbon) fuels in order to reduce CO₂ emissions. A number of countries have already developed and adopted roadmaps to reduce greenhouse gas emissions. One of the main sources of CO₂ emissions are gas turbine power plants designed for gas transmission and power generation.

Currently, there is a global trend towards a systematic reduction in direct CO₂ emissions, which now average 500 g of CO₂ per 1 kWh. In the foreseeable future, it is planned to reduce CO₂ emissions to 340 g CO₂ per 1 kWh and to 100 g CO₂ per 1 kWh over the long term. The natural gas that is currently used in gas turbine power plants, mainly composed of methane (CH₄), is already the lowest "C" containing fuel, so the reduction of "C" atoms in the fuel seems only by the use of hydrogen (H₂). Moreover, it is an additive to natural gas at the initial stage, and in the future it is the main fuel with only water vapor remains in the combustion products while burning.

As part of this paper, a review of modern technologies for the gaseous fuels combustion with a high hydrogen fraction was carried out, problems of using hydrogen as a fuel and ways to solve them were mentioned.