



DOCTORAL RESEARCH TOPIC:

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Investigation on plasma assisted combustion of different gas mixtures for combustion efficiency

RESEARCH FIELD:

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Energetics and Power Engineering (T 006)

BRIEF DESCRIPTION OF RESEARCH TOPIC:

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Due to tightening environmental requirements, it is required to improve the efficiency of energy production, increase the usage of renewable energy sources and reduce emissions from gas combusting plants. This can be achieved by applying the principle of lean fuel-air mixture combustion for existing natural gas burners. However, this method causes flame instability or blow-off, which can drastically reduce the efficiency of the combustion process and a longevity of the equipment. Besides, similar problems occur replacing natural gas with gas from renewable sources, which has lower calorific value. These disadvantages lead to intensive search for innovative solutions to stabilize the flame and ensure an efficient combustion process. One of the possible approach is the use of plasma technology, however there is still a lack of knowledge on plasma application for combustion of gas from renewable sources. For this reason, future PhD studies will focus on the application and influence of non-thermal plasma on the combustion process of various gaseous mixtures, including studies of formed products after plasma and plasma-assisted flame characteristics depending on the gas composition, plasma parameters, combustion conditions and burner configurations to enhance combustion efficiency and reduce emissions. The prospective study is based on spectroscopic flame analysis, gas chromatographic composition of plasma formed and post-combustion products by the flue gas analysis. During PhD studies, an experimental research will be carried out to determine plasma-formed products and plasma-assisted flame emission spectra changing the composition of the gas mixtures, combustion conditions and plasma reactor parameters.

SCIENTIFIC SUPERVISOR:

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