Institute of Chemical Engineering

Adres artykułu: https://iich.gliwice.pl/en/article/what-if-not-ceramic-monolith-development-of-foam-based-catalytic-converter-for-methane-combustion

What if not ceramic monolith? Development of foam based catalytic converter for methane combustion

Duration: 2017 - 2020

Description

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In the field of chemical reactor engineering the most abandoned solution used nowadays is the ceramic monolith. Despite their indubitable advantages, ceramic monoliths suffer from several drawbacks that are relatively low heat and mass transport. An interesting alternative for the reactor structured fillers are metallic foams, which proved to show better than the monoliths transport properties and high porosity resulting in low pressure drop. Since a reactor can be optimized only for a certain process the idea is to apply the structured foam converter to combust methane at low concentrations at high flow rates.

It seems that in the realm of methane catalytic combustion nothing more can be done than it has been done until today. Methane appears in the field of energy and environmental science, being a strong greenhouse effect medium in the latter. In both cases a challenge is its catalytic combustion at conditions mentioned above. Despite years spent on the research into alternative oxide systems, palladium based catalyst on g-Al2O3 deposited in a ceramic monolith remains unbeatable in terms of its high activity for methane low temperature combustion. Thus a question arises whether it is reasonable to seek for other solutions in this field.

Objectives

The project aims to develop a structured reactor based on metallic foams for combustion of methane. Implementation of the objective will be settled on three main tasks entrusted to the three research centres that apply for the project specializing in different areas:

The geometry and fluid flow optimization.

Development of the methods for catalyst material deposition.
Development of an alternative for palladium catalyst for the combustion of methane

Metryczka

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