ALTERNATIVE FUELS

(690) - (*) - FLUIDIZED BED CHEMICAL LOOPING PROCESS FOR GREEN SYNGAS PRODUCTION

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Fluidized bed chemical looping process for green syngas production

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Chemical looping dry reforming and partial oxidation of biogas can be considered as a promising option for generation of green hydrogen and carbon monoxide. The process is heterogeneous since the reactants (CH4 and oxygen carrier) are kept in contact at high temperature in a suitable reactor with moderate heat release. Previous thermodynamic investigation pointed out that using cerium oxide (CeO2) in combination with other metal oxides would be effective, leading to complete methane conversion at temperature of around 1173 K. Further, cerium oxide was found to be selective in syngas production even when CO2 was added to the reforming reactor.
The need of oxygen carrier regeneration imposes the utilization of a fluidized bed system, composed at least of two interconnected reactors. In this case the oxygen carrier should be mechanical resistant and stable for withstanding thermal and physical stresses typical of fluidized beds.
The paper reports first insights into synthesis of a CeO2 based oxygen carrier, its characterization in thermogravimetric apparatus under alternating CH4 atmosphere and oxidation in air, as well as tests of high temperature fluidization in a laboratory scale fluidized bed.

Palavras-chave : hydrogen, methane, reforming