

INTEGRATED SYSTEM FOR OBTAINING COMBUSTIBLE GASES

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Abstract

This paper starts from the idea of transforming CO₂ from various sources into methane through the reaction with hydrogen obtained through the electrolysis of water in which energy from renewable sources such as wind or solar energy is used.

The paper develops an ecological application of the use of methanizers, namely the reduction of carbon dioxide from flue gases. Flue gases with a CO₂ content, depending on the nature of the fuel, will be introduced into a methanizer, as through the combination of CO₂ with H₂, it will lead to the formation of CH₄. The new composition of the combustion gases, with CH₄ instead of CO₂, is even more polluting for the environment, but in certain situations their combustion can be used, producing useful energy, the overall yield resulting from two combustion processes in series.

Experimental study of the methanation process at the laboratory level can be done with a facility that aims to determine the optimal operation and find suitable conditions for the carbon dioxide methanation catalysts. The Methanation Test Facility was designed and commissioned to investigate the catalytic methanation of carbon dioxide and hydrogen.

The paper presents a work flow, with the notification of the total energy efficiency and the assessment of the final CO₂ pollution, which is much less compared to the classic case of the direct evacuation of combustion gases into the atmosphere.

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