Application 2074

Pyrolysis & pyro-reforming of glycerol for CHP application

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Glycerol is a subproduct of biodiesel industry. An important quantity of hydrogen can be produced from glycerol pyrolysis [1-2]. The mechanism of glycerol pyrolysis has been already analyzed, and can be simulated with a certain precision [3]. So it is interesting to know how much energy can be produced using the hydrogen obtained from pyrolysis (or even pyro-reforming) of glycerol by feeding a fuel cell and comparing its performance with that of engines.

The final question will be: is CHP based on fuel cells fed with glycerol pyrolysis products economically worthy?
Pyro-reforming of glycerol has been studied by Linde company to use the produced hydrogen as a fuel for cars running on fuel cells [4]. This study will verify the technical feasibility by fueling a botton SOFC cell with real and/or simulated syngas from a laboratory scale batch pyrolyzer processing crude and raw glycerol at different temperatures. Modeling activities [5] will be coupled with experimental ones.

The activity required to the facility is the development and realization of a test campaign with the aim of identify potentialities of glycerol reformed composition into SOFC single cell. A commercial cell will be used and the investigation will involve the effect of current density, temperature and composition. Effect on voltage and temperature will be main results.

The post analysis of the cell will give additional information on carbon deposition and cell degradation. The results will be used to evaluate the potentialities of the application and to develop a system model based on experimental data.

References

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