Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Valorization of biogas into liquid hydrocarbons in plasma-catalyst reactor[1] MEHRDAD NIKRAVECH, ABDELKADER RAHMANI, SANA LABIDI, NOIRIC SAINTINI, LSPM-CNRS, Université Sorbonne Paris Cité, P13 — Biogas represents an important source of renewable energy issued from biological degradation of biomass. It is planned to produce in Europe the amount of biogas equivalent to 6400 kWh electricity and 4500 kteo (kilo tons equivalent oil) in 2020. Currently the biogas is used in cogeneration engines to produce heat and electricity directly in farms or it is injected in gas networks after purification and odorisation. The aim of this work is to propose a third option that consists of valorization of biogas by transformation into liquid hydrocarbons like acetone, methanol, ethanol, acetic acid etc. These chemicals, among the most important feed materials for chemical industries, retain CO_2 molecules participating to reduce the greenhouse gas emissions and have high storage energy capacity. We developed a low temperature atmospheric plasma-catalyst reactor (surface dielectric barrier discharge) to transform biogas into chemicals. The conversion rates of CH_4 and CO_2 are respectively about 50% and 30% depending on operational conditions. The energetic cost is 25 eV/molecule. The yields of liquid hydrocarbon reaches currently 10% wt. More the 11 liquid chemicals are observed in the liquid fraction.

[1]Acknowledgements are due to SPC Programme Energie de demain

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Date submitted: 29 Jun 2016 Electronic form version 1.4