

# Laboratory Reactions and chemical Process

## PostDoc Proposal in the frame of an H2020 European Project

### Experimental study of the formation of NO<sub>x</sub> during the combustion of biogas and biooils

This work enters in the frame of the European project entitled « INTEGRATED MODEL GUIDED PROCESS OPTIMIZATION OF STEAM CRACKING FURNACES » which gathers Belgium, Italian and French academic partners, together with industrials, DOW, TECHNIP, CRESSBV, JOHN ZINK. The objective of the project IMPROOF is to drastically improve the energy efficiency of steam cracking furnaces by at least 20%, in a cost effective way, while simultaneously reducing emissions of greenhouse gasses and NO<sub>x</sub> per ton ethylene produced by at least 25%. Biogas and bio-oil will be used as alternative fuels because they are considered renewable, and hence, decrease net CO<sub>2</sub> production.

**The purpose of this postdoc performed at LRGP is to study the influence and the formation of NO<sub>x</sub> during the combustion of biogas and bio-oil. The experimental results obtained during this work will be used to validate detailed kinetic models developed in LRGP and in collaboration with Politecnico di Milano.**

The influence of the addition of NO on combustion of biogas and bio-oil surrogates in an O<sub>2</sub>/inert gas mixture will be investigated at moderate temperatures in the quartz jet-stirred reactor.

The formation of NO<sub>x</sub> will be investigated during the combustion of biogas and bio-oil surrogates performed at high temperatures using a newly designed flow reactor which will be built on purpose for this project. This reactor will be composed of a small ceramic tube included in a high temperature laboratory tubular furnace allowing reaching a maximum temperature up to 2000 K.

The combustion products will be analyzed by gas-chromatography (GC-FID, GC-TCD and GC-MS) and a NO<sub>x</sub> analyzer. Analyses by *cw*-CRDS infrared spectroscopy and mass spectrometry with laser ionization can also be planned.

**Salary: 2000€ net per month (including French health insurance)**

**Start:** autumn 2016 - **Duration:** 2 years

#### Supervisors :

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#### Conditions required:

- A PhD diploma,
- Some knowledge about chemical kinetics, modeling and analytical techniques (gas chromatography, mass spectrometry).
- A strong taste for experimental work.
- Good knowledge in English, including writing.
- A French knowledge is a plus.