

Postdoc position

Subject: Development of reliable kinetic models of OPAHs/PAHs for the combustion of oxygenated biofuels

Host laboratory: PC2A, UMR 8522 – CNRS – Uni. Lille (<http://pc2a.univ-lille.fr/fr/presentation>)

Financial support: I-SITE ULNE (<http://www.isite-ulne.fr/index.php/en/i-site-a-label-of-university-of-excellence/>)

Planned start: November 2020

Duration: 18 months

Salary: ~2500 euros gross/month

Contacts: Dr. Luc-Sy TRAN, luc-sy.tran@univ-lille.fr, 03 20 43 49 78



Subject description:

Most currently proposed biofuels contain in their chemical structure one or more oxygen atoms, e.g. alcohols, esters or ethers (called “oxygenated biofuels”). They are considered as promising sources of renewable energy production, which reduces CO₂ emissions and fossil fuel dependence. The use of biofuels is increasing, especially those produced from non-edible cellulosic biomass. Due to the presence of oxygen atoms in the chemical structure of biofuels, soot particles generated from the combustion of oxygenated biofuels contain a high proportion of oxygenates, including oxygenated polycyclic aromatic hydrocarbons (OPAHs) recognized as particularly toxic, thus making soot particles more of a health hazard. The understandings of the formation mechanisms of OPAHs, the relationship between OPAHs and PAHs, and their roles in the soot formation process during biofuel combustion are thus crucial, which help promoting cleaner biofuel combustion technologies. The proposed postdoc project aims to develop reliable kinetic models of OPAHs/PAHs for the combustion of oxygenated biofuels. These models will be tested against experimental data in the literature and those currently being measured at PC2A laboratory. The work includes the following tasks:

- Bibliographic study on OPAHs, associated PAHs, and soot in the combustion of oxygenated biofuels.
- Investigation of reaction pathways of OPAHs and associated PAHs.
- Calculation of missing kinetic and thermodynamic data.
- Validation of the proposed kinetic models against experimental data.
- Analysis and processing of results, and writing of articles.

Candidate profile:

Applicants must have a Ph.D with a strong component in combustion kinetic model development. Experience and aptitude for the modelling approach of PAHs and OPAHs are essential. Skills in theoretical calculations of kinetic and thermodynamic data for combustion conditions are necessary. Skill in soot modelling is an advantage. The candidate will have to justify his/her abilities, particularly in terms of thoroughness and autonomy.

How to apply:

Email to Dr. Luc-Sy TRAN (luc-sy.tran@univ-lille.fr):

- CV
- Cover letter
- References

Deadline: 15 September 2020