



The Combustion Institute

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Post-Doctoral Position

The PC2A laboratory has recently begun experimental and modeling studies on the influence of some additives on the sooting tendency in premixed laminar hydrocarbon flame conditions. The main objective is to control the impact of hydrogen and oxygenated molecules on both gas and particulate phase chemistry in a wide range of operating conditions (equivalence ratio, pressure and proportion of the additive).

On the experimental side, the laboratory has implemented various conventional (GC, GC/MS, IRTF) and diagnostic laser (LIF, LII, CRDS) techniques to cover a wide experimental data base constituted by:

- i) Temperature profiles
- ii) Gaseous species mole fraction profiles including polycyclic aromatic hydrocarbons
- iii) Soot volume fraction profiles
- iv) Distribution of the particle size

Numerically, the laboratory has the expertise to take advantage of the points i) and ii) for the development and validation of detailed phase gas mechanisms in flame conditions. Modeling data of iii) and iv) points is a recent topic in the laboratory. A recent soot code based on the sectional method has been developed and its association with our kinetic mechanisms has been successfully carried out using Cantera code. Our group wishes to recruit a postdoctoral researcher to support the development of this new theme. The person hired will support modeling soot volume fraction and particle-size distributions. The candidate is expected to be able to make the necessary improvements to the soot code such as taking into account the reversibility of some processes between the two phases.

Essential Requirements

Applicants will hold a Ph.D. degree in Chemical or Mechanical Engineering.
The position requires skills in:

- Coding and software development skills (mainly C++/Python, other languages considered) in order to improve the existing sectional soot model implementation in Cantera;

- Detailed soot modelling (sectional or moment methods, stochastic approaches)
- Combustion chemistry and laminar 1D-flame simulations;

How to Apply

For application, send a detailed CV which includes the list of publications, a covering letter and contact details to:

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Salary: This work is supported by CPER CLIMIBIO (<http://climibio.univ-lille.fr/>). Month salary depends on candidate experience.

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