

**PhD position at IFP Energies nouvelles (IFPEN)**  
in *Chemical sciences applied to the atmosphere*

**Impact of hydrocarbons chemistry on secondary organic aerosols properties**

Fine particles are among the main contributor to poor air quality. They are particularly monitored as 97% of the European population living in urban areas was exposed in 2021 to particle concentrations above the WHO guideline of 5  $\mu\text{g}/\text{m}^3$ . However, characterizing and understanding the impact of these particles is complex, given the multiple biogenic and anthropogenic sources, as well as their subsequent physical and chemical evolution once in the atmosphere. In addition, the fuel from which particles are originated influences their properties, which in turn modifies their environmental impact and toxicity. The shift in the transport sector towards renewable products will thus affect the environmental impact of emissions.

The proposed research aims at assessing experimentally the link between different renewable fuels and the atmospheric aerosols generated. To this end, different fuel chemistries will be studied, and the evolution of the emissions generated will be discussed using a dedicated reactor available at IFPEN. This device enables an accelerated atmospheric ageing process representative of different areas (e.g. urban, rural) controlling for example, radical concentration and UV radiation. Analytical equipments will be set up to monitor the main physical and chemical descriptors for the aerosols generated. These analyses will provide relevant properties such as the size, morphology, chemical functions and composition of the aerosols. Their concentration and decay versus time in different ageing conditions will also contribute to discuss the fuel impact. A better understanding of fuel impacts on aerosols formation and reactivity could help assessing the real environmental impact of novel energy products.

This subject should enable us to acquire solid experience in the field of atmospheric chemistry and the tools used to study it. This knowledge is essential to support the decarbonization of transport.

**Keywords:** Atmospheric chemistry, aerosols, aging, low carbon fuels, chemical kinetic

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<b>PhD location</b>	IFPEN, Lyon, France
<b>Duration and start date</b>	3 years, starting in the fourth quarter 2024
<b>Employer</b>	IFPEN
<b>Academic requirements</b>	University Master degree in chemistry, atmospheric chemistry
<b>Language requirements</b>	English level B2 (CEFR), French level A2 (CECR)
<b>Other requirements</b>	High interest in experimental activities and strong knowledge of analytical chemistry techniques.

To apply, please send your cover letter and CV to the IFPEN supervisor indicated here above.

### About IFP Energies nouvelles

IFP Energies nouvelles is a French public-sector research, innovation and training center. Its mission is to develop efficient, economical, clean and sustainable technologies in the fields of energy, transport and the environment. For more information, see [our WEB site](#).

IFPEN offers a stimulating research environment, with access to first in class laboratory infrastructures and computing facilities. IFPEN offers competitive salary and benefits packages. All PhD students have access to dedicated seminars and training sessions.