

Final report

Internship abroad

Personal data and general information on the internship

Subject of studies: Materials Science

Bachelor/Master/State exam: Master's Degree

Time of internship: 4 months

Place of internship: MAMASELF University of Rennes

Internship institution: University of Rennes

As part of the completion of my master thesis within the framework of the MAMASELF program, an international Master in Materials Science, I carried out a six-month research internship in France. My home institution was the University of Turin, and I was hosted by the University of Rennes, which coordinated my agreement with the partnering company TotalEnergies. The research was conducted at the PERL (Pôle d'Études et de Recherche de Lacq) group, located in Lacq, which specializes in gas separation and storage technologies. This internship opportunity was presented through the MAMASELF network and was specifically proposed to students within my cohort. I secured accommodation independently and resided at the CROUS student residence, which provided affordable housing and a community environment conducive to student life. Although I did not attend formal French language courses, I interacted daily with French-speaking technicians and colleagues, which substantially improved my listening comprehension and spoken communication skills. Several training sessions were also conducted in French, further enhancing my language abilities.

The core focus of my internship was contributing to a research project involving laminated adsorbents, thin polymer-MOF composite films engineered to capture CO₂ from flue gases produced during combustion. My main tasks included the synthesis of these films, in which I varied the ratio of polymer matrix to metal-organic framework (MOF) components.

I performed mechanical characterizations such as elasticity and thickness measurements, humidity resistance tests, and conducted gas uptake experiments to quantify CO₂ adsorption efficiency. In addition, I implemented analytical methods to determine the extent of interaction between the polymer and MOF materials within the composite.

A typical workday ran from 8:00 AM to 4:00 PM. TotalEnergies provided a shuttle service that facilitated my commute to the research center, located approximately 30 km from my residence. My daily activities were balanced between hands-on laboratory work and office-based data analysis. Weekly planning meetings on Mondays allowed for a well-organized distribution of tasks that aligned with the time available, contributing to a highly productive and motivating experience.

Throughout the internship, I was guided by two supervisors, one from the university and one from the company, who were both highly engaged and supportive of my thesis development. I also collaborated closely with a PhD student working on a related topic, which provided an enriching peer-to-peer learning environment. The research team was dynamic and diverse, with a young demographic and a female-majority composition (approximately 70%), which contributed to a welcoming and stimulating atmosphere.

I lived in Pau, a small yet vibrant city in southwestern France. Despite its size, Pau boasts a substantial student population, resulting in a rich calendar of activities and cultural events tailored to young people. The city is known for its numerous parks and outdoor spaces, where I pursued my passion for sports including running, volleyball, and swimming. Thanks to its proximity to both the Pyrenees mountains and the Atlantic coast, each just an hour away, I often explored these natural destinations with colleagues on weekends.

Cultural enrichment was another highlight of my time in Pau. I regularly attended museums and public events, many of which were free for individuals under 25. While the cost of food was higher than anticipated, I was able to maintain a balanced diet with some budgeting. The affordability of student housing helped offset overall living expenses. Additionally, I acquired the “Carte Avantage Jeune,” a train discount card that enabled affordable travel across France and allowed me to visit several cities, which would have otherwise been difficult without a car.

The theoretical and practical skills developed during my master's program, and reinforced by my background in chemistry, proved essential for my contributions during this internship. At the same time, I acquired a deeper understanding of advanced materials concepts through hands-on experience and collaborative work.

This internship has solidified my passion for scientific research, particularly in the field of materials for environmental applications. The opportunity to apply academic knowledge to real-world challenges, work within a multidisciplinary team, and live in a culturally rich setting has been both personally and professionally transformative. It has affirmed my decision to pursue a PhD, and I am eager to continue developing my expertise in this exciting and impactful area of research.

Musée national et domaine du château de
Pau



Le boulevard des Pyrénées Pau

