

Postdoctoral study of 12 months

Mines Paris, Centre de Mise en Forme des Matériaux (CEMEF) Sophia Antipolis, France

"Study of the Influence of Using Recycled PET Resins on the Thermoforming of Yogurt Cups"

Context: The recycling of food packaging is now a major ecological, societal, and industrial challenge. The current market trend prioritizes "mono-material" solutions for food packaging, with PET emerging as one of the most promising candidates. The European Parliament approved the "Single-Use Plastics" (SUP) directive in March 2019, setting a collection target of 90% for plastic bottles by 2029 (77% by 2025). Additionally, from 2025, 25% recycled plastic must be incorporated into PET bottles, increasing to 30% for all plastic bottles by 2030. Regarding recycled PET (rPET), especially blends that have undergone multiple processing cycles and potential degradation, new approaches must be developed to optimize existing forming processes. The objective of this study is to better understand the impact of using recycled PET resins (rPET) from different mechanical recycling streams on the thermoforming process of yogurt cups.

This postdoctoral study will be conducted in close collaboration with DANONE. Experimental protocols available at both CEMEF and DANONE will be applied to gain deeper insights into the relationships between the process, microstructure, and final properties.

Project Description: The main objective of this project is to address key challenges and technical issues related to controlling the thermoforming process when using recycled PET (rPET). The scientific approach is based on the physico-chemical, thermal, and mechanical characterization of rPET sheets, understanding their hot stretchability, and correlating thermoforming results with the properties of the tested rPET materials.

Tools: Experimental platform equipped with DMA, DSC, XRD, uniaxial stretching coupled with local strain and temperature field measurements, and a hot forming prototype (thermoforming).

Profile and Skills: The selected candidate must hold a PhD in polymer materials science. He (she) should have strong expertise in the mechanics and physics of solid-state polymers. Given the applied nature of the research, a strong interest in experimental approaches is essential. Experimental rigor, as well as strong analytical and communication skills in English, will be required.

Duration: 12 months, as soon as possible

Approximate gross annual salary: 36.5 k€

Location: CEMEF, Mines Paris, Sophia-Antipolis (06), France (<https://www.cemef.minesparis.psl.eu>).

Research team: Surfaces and Polymers (<https://www.cemef.minesparis.psl.eu/presentation/equipe-sp/>)

Applications: Applications should be sent to the supervisors listed below and must include: a CV, a cover letter, and the contact details of two referees to recommend the candidate.

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