Horizon Europe - Marie Sklodowska-Curie - Doctoral Networks

ReBond: A Universal platform for recycling plastic waste using dynamic covalent bonds

## Doctoral Candidate 11

# Modelling vitrimer dispersion and its influence on nonlinear rheology

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This PhD project is part of the European Doctoral Network 'ReBond', which involves eight Universities, five industrial partners and 15 PhD students. By combining the expertise of the different partners in synthesis, advanced characterization, linear and nonlinear dynamics, mechanical properties, modelling, and plastic product development and processing, we shall uncover the underpinning relationships among processing and performance of vitrimer-based recycled plastics and elastomers.

Within this framework, the objective of this PhD will be to investigate, based on theoretical models, the dispersion of vitrimers within a homopolymer matrix as function of the crosslink density and concentration of vitrimers, and to then extend this study to polymer blends composed of linear chains of two different chemistries. The research activity will also focus on the nonlinear rheology of vitrimeric systems, to be validated against experimental data.

This project, which will be achieved in collaboration with the University of Leeds (ULeeds), is mostly based on a modelling activity, requiring use and development of molecularly-based static and dynamic models of vitrimers.

ReBond is a highly interdisciplinary and inter-sectorial project, the groups involved are world-leaders in their fields, and the tasks strategically designed to ensure strong synergies. It offers young researchers an extraordinarily diverse training platform with a deep grasp of soft matter and unique exposure to industrial environment, needed to address emerging scientific and technological challenges.

The applicant must have a Master's degree in engineering, material science or physics. Good knowledge of polymers physics and rheology is required. Additional knowledge in scientific programming and coding is a plus.

**Applications should be sent by email (a single pdf file containing a detailed CV, a transcript of marks obtained during the Master, a motivation letter, and the names of two referees) to: rebond-manager@uclouvain.be**

**The applicant has to clearly indicate the number of the project(s) for which he/she is applying.**

**Starting dates: between October 2023 and December 2023**

**Project duration:** 24 Months at UN (Italy) and 24 Months at UCLouvain (Belgium) including a long stay at ULeeds (United Kingdom)