Name: Francesca Bertella

Name of the project: Self-assembling in Poly(hydroxyalcanoate)s

Abstract of the project:

To preserve optimum resource utilization in the biobased value circle, polycondensates form an ideal class of materials. Next to the selection of biobased (macro)molecular building blocks, readily available re- and upcycling strategies are opportune to preserve high caloric value and chemical functionality. Poly(hydroxyalkanoate)s are polymerized with extreme precision in bacteria, unique in kind and classify as fermentation derived polyesters. Other well-known biobased polyesters are polylactide (PLA) and polyethylene furanoate (PEF). The mass adoption of biobased polyesters in general is challenged by the intrinsically low crystallization rate, Figure 1. The resulting incomplete crystallization leads to thermodynamic instability and inferior mechanical properties of end products obtained via industrial fast melt-processing. The goal of the project is to chemically tailor the design of (partly) biobased nucleating agents, the surface of natural nano-fillers obtained from biorefinery processes and to control ultimately structure – function relationships. Performance indicators are thermodynamic stability, mechanical properties, melt recyclability and biodegradability (compost/natural).

Introduction of the ESR:

I am 25 years old and I am from La Spezia, Italy. After finishing my Bachelor's studies in *Chemistry and chemical technologies*, I pursued a Master of Science Degree in *Industrial Chemistry*, developing particular interest in the fields of polymers, biomedical applications and industrial processes. My Master thesis focused on the investigation of interfacial stereo-complexation phenomenon of a PLLA/PDLA powders mixture for Selective Laser Sintering 3D printing application.

Keywords: Biobased materials, Nucleating agents, Crystallization, thermic and mechanical performances.

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