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Effect of additives on properties of bio-based polymers and their blends

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The production of materials based on biodegradable polymers by industrial processings requires specific investigations in order to control and tune the final properties of the materials produced in particular addressing thermal stability, mechanical properties, compostability and sustainability. In particular, biodegradable polyester such as polylactic acid (PLA), and polyhydroxyalkanoates (PHA) are brittle materials with relatively low glass transition temperature and slow crystallization. These polyesters require an accurate control of processing parameters in order to predict and achieve the targeted final properties. Systematic studies on different amount and types of plasticizers, nucleating and strengthening agents, addressing chemical, rheological, morphological, thermal and mechanical properties of these materials are necessary in order to predict their behaviour and be able to exploit their potentialities. Moreover, a deeper study addressing the morphology and kinetic of crystallinity is also very important to understand and control the behaviour of this material during and after processing. The present contribution reviews the study of the effect of plasticizers, and nucleating agents on crystallinity and properties of PLA and PHA as addressed also in the research activity of the EC projects DIBBIOPACK GA 280676 and LEGUVAL GA 314251.

Biography

Patrizia Cinelli is a PhD student in Chemistry at Pisa University, partly performed at the United States Department of Agriculture (USDA), Peoria, IL, USA. She is researcher at the National Research Council, and Contract Professor of Applied Chemistry and Materials Science at the Master Degree Laurea in Construction Engineering and Architecture at Pisa University. She regularly acts as reviewer for several international journals on materials science. She has over 20 years of experience in materials science, polymer processing and characterization, biodegradation and life cycle assessment. She is co-author of over 40 papers in peer reviewed journals, 9 book chapters, and 8 patents on innovative materials.

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