

## **A new generation of nano-biocomposites based on renewable resources**

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Nano-biocomposites are a new generation of nanocomposites, elaborated by the association of biopolymers with nanofillers (mainly nanoclays) [1,2]. The biopolymers/nanoclays materials are a valid answer to produce low cost, highly competitive and pioneering environmentally friendly materials. Moreover, since the citizens are more and more concerned about sustainable development and since the global need and the price of the fossil resources increase, these materials now represent an interesting option to replace conventional fossil resources based plastics. These materials present a wide range of applications, such as packaging, agriculture devices, or even for biomedical applications. This presentation shows main results obtained with different nano-biocomposites, which are based on various bio-matrices (Plasticized or not) such as starches [3], PHA (Polyhydroxyalkanoates)[4], and PLA (polylactic-acid) with nanoclays (montmorillonite and sepiolite). The elaboration of these different Nano-biocomposites are presented with their main properties (thermal, mechanical behavior ...) and the corresponding nano-structures. The main "structure-properties-process" relationships are shown. Finally, these different systems are compared. - References: [1]- Bordes P., Pollet E., Avérous L. (2009) « Nano-biocomposites: Biodegradable polyester/nanoclay systems » Progress in Polymer Science, Vol. 34. pp. 125-155. [2]- Chivrac F., Pollet E., Avérous L. (2009) "Progress in Nano-Biocomposites Based on Polysaccharides and Nanoclays" Materials Science & Engineering R. Vol. 67, pp. 1-17. [3]- Chivrac F., Pollet E., Schmutz, M., Avérous L. (2008) "New approach to elaborate exfoliated starch-based nano-biocomposites" Biomacromolecules, Vol. 9 N°3, pp. 896-900. [4]- Bordes P., Pollet E., Bourbigot S., Avérous L. (2008) « Structure and properties of PHA/clay nano-biocomposites prepared by melt intercalation » Macromolecular chemistry & physics, Vol. 209, N°14, pp. 1473-1484.