

# Investigation of the isothermal crystallization of PLA/PCL blends

Fabiana Massarente Pereira<sup>1</sup>, Marcelo Aparecido Chinelatto<sup>1</sup>

<sup>1</sup>Escola de Engenharia de São Carlos- Universidade de São Paulo

*e-mail: fabiana\_mpereira@yahoo.com.br*

Poly(lactic acid) (PLA) is a thermoplastic polyester that has been used in different applications because of some interesting characteristics it possess like biocompatibility and biodegradability [1,2]. However it has some disadvantages like slow crystallization rate what difficult its use as an engineering material [3]. Therefore, it is crucial to enhance crystallization rate of PLA for industrial applications. In this study, the isothermal crystallization behavior of PLA/PCL blends with and without compatibilizers was investigated by DSC analysis and compared with pure PLA. In the presence of PCL, nucleation process became faster in uncompatibilized blends comparing to PLA homopolymer, but does not have expressive change in crystallization rate because of slower growth step. However, compatibilized blends with triblock copolymer derived from  $\epsilon$ -caprolactone and poly(tetramethylene ether) glycol (CH) and diblock copolymer derived from  $\epsilon$ -caprolactone and an aliphatic polycarbonate (CB) showed a very good increase in crystallization rate, especially when CB was used accelerating three times the crystallization process. These are very expressive results, comparing samples compatibilized with CB and CH with pure PLA, considering industrial process that could be much faster and low cost using this compatibilizer.

## Acknowledgments:

This work was supported by CNPQ.

## References

- [1] R. M Rasal.; A. V. Janorkar; D. E. Hirt. Progress in Polymer Science, 35, 338-356 (2010).
- [2] K. Chavalitpanyaa; S. Phattandarudee. Energy Procedia, 34, 542 - 548 (2013).
- [3] Y. Xu; Y. Wang; T. Xu; J. Zhang; C. Liu; C. Shen. Polymer Testing, 37, 179-185 (2014).

