



Stabilitätspakt für Südosteuropa  
Gefördert durch Deutschland  
Stability Pact for South Eastern Europe  
Sponsored by Germany

*Workshop "From Molecules to Functionalised Materials" – Ohrid, September 2014*

## **Preparation and recycling of polymer eco-composites**

Vineta Srebrenkoska<sup>1</sup>, Gordana Bogoeva Gaceva<sup>2</sup>

<sup>1</sup>University Goce Delcev, Faculty of Technology, Krste Misirkov 10-A, Stip,  
Macedonia, e- mail: [vineta.srebrenkoska@ugd.edu.mk](mailto:vineta.srebrenkoska@ugd.edu.mk)

<sup>2</sup>University Ss. Cyril and Methodius, Faculty of Technology and Metallurgy, Ruger  
Boskovic 16, Skopje, Macedonia

The interest in natural fiber-reinforced polymer composites is growing rapidly due to their high performance in terms of mechanical properties, significant processing advantages, excellent chemical resistance, low cost and low density. In this lecture, the compression and injection molding of polypropylene (PP) and polylactic acid (PLA) based composites reinforced with rice hulls or kenaf fibres will be presented and their basic properties will be discussed. Rice hulls from rice processing plants and natural lignocellulosic kenaf fibres from the bast of the plant *Hibiscus Cannabinus* represent renewable sources that could be utilized for composites. Maleic anhydride grafted PP (MAPP) and maleic anhydride grafted PLA (MAPLA) were used as coupling agents (CA) to improve the compatibility and adhesion between the fibres and the matrix. Investigations of the possibilities for reuse of the polymer eco-composites have been carried out. The eco-composites based on recycled matrices and recycled composites were produced and structure/properties relationships were investigated as a function of the number of reprocessing cycles. As a result of comparison of the composites properties, the polymer eco-composites belong in the category of materials which could be used as non-load bearing construction materials for different industries.

**Keywords:** polypropylene, polylactic acid, composites, rice hulls, kenaf fibres.

### References:

- [1] V. Srebrenkoska, G. Bogoeva Gaceva, D. Dimeski *Macedonian Journal of Chemistry and Chemical Engineering* **Vol. 28** No. 1 (2009) pp. 99–109.
- [2] V. Srebrenkoska, G. Bogoeva-Gaceva, M. Avella, M. E. Errico, G. Gentile *Polymer-Plastics Technology and Engineering* **Vol. 48** (2009) pp. 1113–1120.
- [3] B. Dimzoski, G. Bogoeva-Gaceva, G. Gentile, M. Avella, M.E. Errico, V. Srebrenkoska *J. Polym. Eng.* **Vol. 28** (2008) pp. 369–384.
- [4] M. Avella, G. Bogoeva-Gaceva, A. Buzarovska, M.E. Errico, G. Gentile, A. Grozdanov *J Appl Polym Sci.* **Vol. 104** (2007) pp. 3194–3200.
- [5] ECO-PCCM, FP6-INCO-CT-2004-509185.
- [6] S. Serizawa, K. Inoue, M. Iji *J. Appl. Polym. Sci.* **Vol. 100** (2006) pp. 618–624.