

# RECYCLING AND REUSE FACILITIES OF LIGNOCELLULOSIC MATERIAL FILLED ECO-COMPOSITES

Maurizio Avella<sup>1</sup>, Gennaro Gentile<sup>1</sup>, Gordana Bogoeva-Gaceva<sup>2</sup>,  
Maria E. Errico<sup>1</sup>, Anita Grozdanov<sup>2</sup>, Aleksandra Buzarovska<sup>2</sup> and Vineta Srebrenkoska<sup>3</sup>  
<sup>1</sup> *Institute of Chemistry and Technology of Polymer-ICTP, Via Campi Flegrei 34, 80078- Pozzuoli, Napoli, Italy*  
<sup>2</sup> *Faculty of Technology and Metallurgy, Rugjer Boskovic 16, 1000 Skopje, R. Macedonia*  
<sup>3</sup> *Eurokompzoit, Prilep, R. Macedonia*

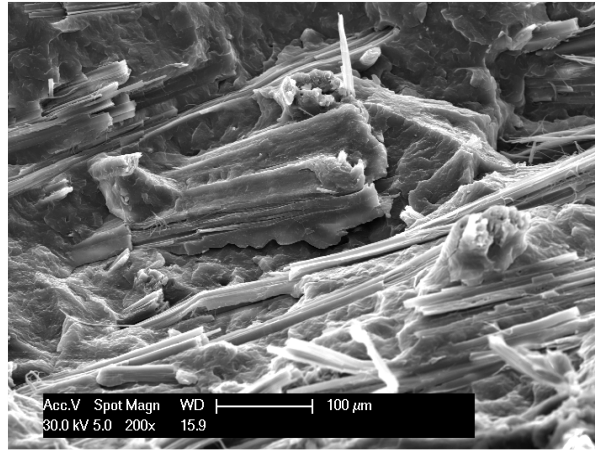
**KEYWORDS:** Recycling, Reuse, Lignocellulosic filler, Eco-composites.

The increased ecological consciousness has generated the concept of sustainable development of environmental resources with improved economic activities. Also, the International Community and waste legislation are influencing the composite industry, such as EU directives, End of Life Vehicles (ELV) and Waste Electrical and Electronic Equipment (WEEE), increased the pressure on solving fibre reinforced polymer waste management through recycling and reuse [1,2].

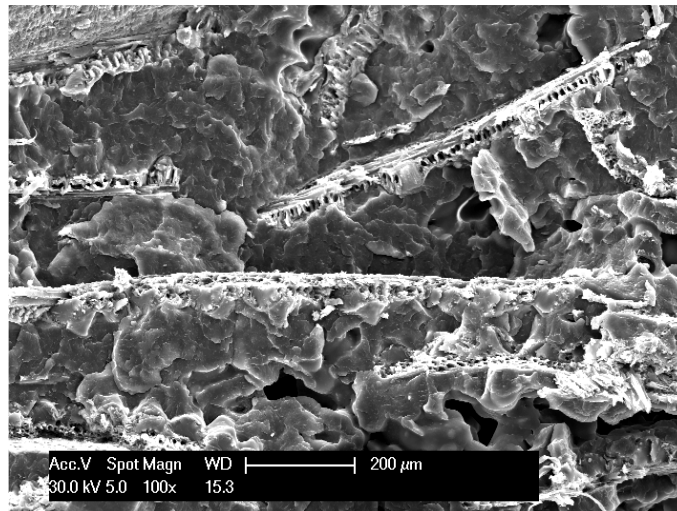
So, one of the objectives of our ECO-PCCM project is to design the recycling and reuse facilities of eco-composites [3]. The aim of this work is to show the possibilities of recycling and reuse of thermoplastic polymer matrices with rice hulls (RH) and kenaf fibres (KF) using the conventional techniques, extrusion and compression moulding. The investigation have been performed in three steps: i) investigation of the recycling ability of the polymer matrix, ii) application of the recycled matrix for production of the rice hulls composites and kenaf eco-composites, iii) investigation of the recycling ability of the rice straw and kenaf fibre composites.

Characterization of all the recycled composites includes mechanical, morphological and thermo-gravimetric analysis.

The obtained results have shown that both polymer matrices (biodegradable and non-degradable) could be recycled with acceptable mechanical properties and they can be successfully used for production of eco-composites. Increased modulus have been measured for both tensile and flexural, from 12 to 32 %, while tensile and flexural strength were slightly decreased. The same tendency was obtained and for the mechanical properties of the recycled composites. SEM analysis has shown that the agricultural fillers are covered by the recycled polymer matrix, indicated on the satisfied durability of the recycled polymer matrices.



*Fig. 1: SEM of TPPx1/KF/CA (x100)*



*Fig. 2: SEM of TPPx1/RH/CA (x100)*

## REFERENCES

1. Netavali A.N., Chabba S., “ Composites get greener“, *Materials today*, vol.6, No. 4, 22-29 (2003)
2. Peijs T., “Composites for recyclability”, *Materials today*, vol.6, No. 4, 30-35 (2003)
3. ECO-PCCM, FP6-INCO-CT-2004-509185