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*18:20 Restabilization of Secondary Polyolefins*

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## **Restabilization of secondary polyolefins**

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### **ABSTRACT**

Four main possibilities are known for plastic waste treatment: deposition, burning with or without energy recovery, and chemical or mechanical recycling. In the last decade laws and regulations appointed to reduce the amount of plastic waste for deposition [1].

In the course of my work I have participated in W2Plastics (EU7) and Recytech (Hungarian) recycling projects aiming the recovery of pure polyolefin waste fractions originated from automotive, electronic and building industries. Main target of my research is the value-added recycling of these industrial polymer wastes.

The purpose is the development of the recyclates for several applications by upgrading with fire retardancy, stabilization and reinforcement. The improvement of properties can be verified by mechanical, rheological and combustibility measurements.

In the present work stabilizers were tested in different concentrations on reference polypropylene and also on plastic wastes containing mainly polypropylene [2]. With restabilization the aim was to protect the polymer from degradation during processing and reuse. Although several mechanisms of polymer degradation are known, high temperature and the presence of oxygen favour the thermooxidative degradation during the processing.

Degradation has a great influence on the properties of plastics. Molecular weight will change, and therefore also the melt flow viscosity, mechanical properties will decline, and it will lose its original colour [3]. Number of carboxyl groups will increase as function of time, which can be detected by FTIR.

We performed model measurements with virgin materials and also with waste. The effects of the stabilizers were tested. Some samples were aged in an aging chamber at 95 °C others were homogenized seven times with a double-screw extruder. After aging or multi-extrusion oxidation induction time (OIT), melt flow index (MFI) and yellowness index (YI) were measured. In order to examine the change of mechanical properties; fracture tests, bending tests and tensile tests were also performed.

In the future this work may be of assistance in finding an appropriate solution for plastic waste recycling.

## References

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- [3] Pospíšil J., Sitek F.A., Pfaendner R., *Upgrading of recycled plastics by restabilization – an overview*  
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