

THE INFLUENCE OF PROCESSING AND FORMULATION ON THE PROPERTIES OF POLYAMIDE-POLYETHYLENE BLENDS

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In packaging applications, nowadays typically multilayer films are applied to fulfil a variety of requirements like tenacity, printability, barrier properties and food contact approval. One persistent problem with such films is their recycling, even as low contaminated, unprinted post-industrial waste, which is present as start-up materials and edge-trim, as the different layers are usually incompatible, thus re-melting results in degraded properties, which are insufficient for most applications. Therefore, the aim of this work was to investigate the influence of processing and formulation on the properties of polyamide 6/polyethylene blends.

Different blends, with variations in composition in terms of polyamide concentration, containing ethylene vinyl alcohol (EVAL) or ethylene vinyl acetate (EVA) as barrier layers as well as compatibilizers, were produced via compounding and injection moulding. While in injection moulding, the process was kept constant, in compounding we looked at variation of screw geometries. These compositions were tested for mechanical (tensile and impact) and rheological properties as well as the composite morphology was investigated via SEM.

In conclusion, we found that it is possible to influence the blend properties, which is clearly linked to the blend morphology, via screw design as well as the formulation. Furthermore, we found that the effectiveness of compatibilisation is strongly depending on the chemical composition of the different materials in the blend – even with EVA one finds some compatibilisation effects – which shows the possibilities to re-use such materials again.