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INFLUENCE OF EVA MOLAR MASS ON PREPARATION OF EVA-g-PCL BIOBASED COPOLYMERS

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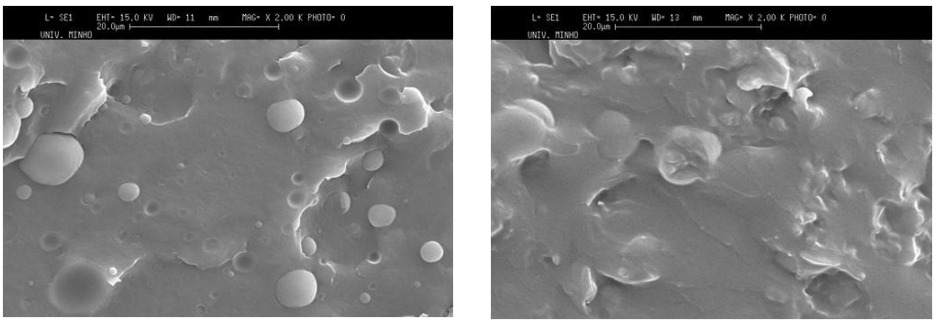
The rapid growth of plastic production is considered as a serious source of environment pollution. Approximately 100 million tons of plastics are produced each year and within a short period of time almost half are disposed to the environment. A way to overcome this problem would be the use of biodegradable polymers. Several attempts are made to replace synthetic polymers by biodegradable ones. Nevertheless, they did not prove yet to be useful for commercial applications due to their high price or limitations in terms of thermal and mechanical properties.

Alternative to biodegradable polymers are biobased polymers, which can be prepared by blending or copolymer formation of a biodegradable and a synthetic polymer. Thus, the present work aims to prepare copolymers of ethyl vinyl acetate (EVA) and poly(ε-caprolactone) (PCL), EVA-g-PCL, and to study the influence of the molar mass of EVA on copolymer formation and its properties.

The materials were prepared in a internal batch mixer using titanium propoxide ($Ti(OPr)_4$) as catalyst. Characterization was performed by selective extraction of the formed copolymers, SEM, FTIR, rheology, DSC, TGA and tensile properties.



a) b)

Figure 1. SEM micrographs a) EVA-g-PCL (M_n (EVA) =18 000 g/mol) b) EVA-g-PCL (M_n (EVA) =7900 g/mol).

Morphological results by SEM evidence copolymer formation, the particle size of the dispersed phase decreases as the EVA molar mass decreases. The tensile properties of the prepared materials are similar to the ones of synthetic polymers. The biodegradability,

evaluated based on biochemical oxygen demand method, showed that biodegradability increases as the EVA molar mass increases.

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Keywords: Ethyl vinyl acetate; poly(ε-caprolactone), grafting, biobased.