Study of the immiscibility SBS/PCL polymer blend

METREF Driss[1], METREF Lynda[2]

[1]Centre de recherche nucléaire de Draria, Alger, Algerie
[2] Ecole Supérieure des Techniques de l'Aéronautique, 16100 Alger, Algérie
metref_driss@yahoo.fr

Abstract. Polymer blends are currently a very important area of research and development in the field of plastic materials, since we are improving different chemical and mechanical properties that only one polymer can not possess.
Polymers rarely lead to miscible mixtures and their miscibility depends on both their structure and their molecular weight. A first approach to their miscibility can be made from thermodynamics and the calculation of the free enthalpy of mixing.
As for the immiscible polymers, one often has a dispersed phase in another. In order to improve the dispersion and the mechanical properties, it is possible to use compatibilizers which are generally copolymers synthesized independently of the mixture or generated in situ during mixing.
The dispersion can also be improved by a judicious choice of mixing tools (extruder screw profile ...). The quality of the dispersions can be evaluated by making films. If these are transparent, it may be an indication that the polymers present are miscible. This first approach may be supplemented by further analyzes: measurements of glass transition temperatures, melting and study of the amorphous or crystalline nature of the polymers in question.

Keywords: Immiscibility, poly-ε-caprolactone (PCL), Styrene-butadiene-styrene (SBS).

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