

The Effect of Chemical Treatment of Cellulose with Epoxidized Soybean Oil (ESO) on the Properties PVC/Cellulose Composites

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The adhesion between vegetable fibres and the polymeric matrix remains one of the technological bolts of the development of composites. Indeed cellulose, the principal constituent of vegetable fibres, is not generally compatible with thermoplastic matrices. Many studies thus focus on the improvement of these properties, in particular by the means of physical or chemical treatments of fibres. The objective of this work was the chemical modification of cellulose by epoxidized soybean oil to improve compatibility between the cellulose and the matrix. The effect on the physico-mechanical properties of the PVC/cellulose composites containing 10 to 30% treated cellulose was studied. The resultant composites were characterized various tests (mechanical, thermal and morphological).

Keywords Cellulose; composites; epoxidized soybean oil; interfacial adhesion; poly (vinyl chloride)

Introduction

The combination of woody materials with thermoplastic polymers to yield wood polymer composites (WPC) is gaining more and more attraction in USA and Europe. A wide range of commercial products are already available on the market because they are renewable, biodegradable and environmentally friendly [1].

Biopolymers or synthetic polymers reinforced with natural fibre can be viable alternatives to glass fibre reinforced composites. Though natural fibres have appealing properties they also suffer from some serious setbacks due to their hydrophilic character. This limitation is remedied by several methods like alkaline treatment, grafting functional moieties onto the fibres, introduction of coupling agents or pre-treatment of fibres with suitable agents. An enormous amount of research has been invested in studying the modification of natural fibres and their subsequent characterization in composites [2,3].

In the present work, we have endeavoured to present cellulose reinforced PVC composites and investigated the effect of filler content and fibre treatment on the morphological,

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