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PREPARATION OF NOVEL MALEIC-ANHYDRIDE MODIFIED STYRENE BUTADIENE RUBBER /SEGMENTED POLYURETHANE AND EVALUATION OF THEIR PROPERTIES AND COMPATIBILITY

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In this work, Maleic anhydride modified Styrene butadiene (SBR-g-MA)/segmented polyurethane (PU) blends were prepared.SBR has been modified using MA in the presence of benzoyl peroxide (BP) via melt mixing. Then ester-ether based polyurethane mixed with modified SBR using an internal mixer in various weight ratio of MA to SBR. Since amount of benzoyl peroxide to maleic anhydride and processing parameters such as temperature and shear- rate affect on grafting reaction , optimum values has been measured to reach the best efficiency of grafting reaction. In the second step, blends of modified SBR/PU with weight ratio of 70/30 have been prepared and analytical techniques such as attenuated total reflectance infrared Fourier transform spectrometry (ATR-FTIR), tensile tests, Scanning electron microscopy (SEM) and abrasion test were used to characterize the properties of blends. Quantitative and qualitative analysis using ATR-FTIR have been used to confirm grafting of MA to SBR chains. Compatibility and interfacial interaction between modified SBR and polyurethane has been investigated via mechanical and morphological tests such as tensile, abrasion, density and SEM analysis respectively. Increased mechanical properties in modified SBR/PU blends show more compatibility rather to unmodified SBR/PU blend due to grafting of MA to SBR chains. Indeed PU has been distributed in SBR matrix caused to reinforcement and improvement physical and mechanical properties of SBR. Furthermore there is significant difference between morphology of dispersed phase (PU) in the modified and unmodified SBR/PU blends. In fact, single amorphous phase consist of soft segment of the PU and modified SBR formed. The formation of this phase leads to compatibility of modified SBR/PU. The better compatibility was concluded to result from Hydrogen bond formation between the carbonyl groups in [SBR-g-MA] and -(NH) groups of PU.