Journal Article – Volume 33, Issue 11, Journal of Thermoplastic Composite Materials 2020, Pages 1533 - 1554

Thermal and mechanical properties of chemical modification on sugarcane bagasse mixed with polypropylene and recycle acrylonitrile butadiene rubber composite

Abstract

The goal of this research is to investigate the thermal, chemical, and tensile properties of chemical modification of sugarcane bagasse (SCB)-filled polypropylene (PP) and recycled acrylonitrile butadiene rubber (NBRr). The composites with different SCB loading (5, 15, and 30 per hundred resin) were prepared using a heated two-roll mill at temperature of 180°C.Thermal and the tensile properties of the modified SCB composite have shown improvement. The silane-treated composites have higher thermal stability compared to treated NaOH. The degradation temperature at 70% weight ($T_{70\%}$) of NaOH and silane composite increase by 6% and 15%, respectively. Meanwhile, the tensile strength and Young's modulus for the both treatment showed an improvement of 20% and 25% for NaOH and 30% and 32% for silane compared to untreated composites, respectively. The chemical properties were investigated using Fourier transform infrared analysis. The modification SCB fiber has improved the adhesion and interfacial bonding between SCB fiber and PP/NBRr matrices.

Keywords

Chemical treatment; Composites; Fourier transform infrared analysis; Polypropylene; recycled acrylonitrile butadiene rubber; Sugarcane bagasse; Thermal properties