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Heat treatment on PEDOT: PSS polymer composite nanofibers

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Poly(3,4-ethylenedioxythiophene)/poly(styrene sulfonate) (PEDOT:PSS) as conductive polymer has been widely used for various electrical compartments such as photovoltaics, solar cell, electronic displays, organic light emitting diodes, and touch panels etc.

Most applications of PEDOT:PSS are as coating material on the wafer such as silicone. Recently, studies on nano fibrous web made of PEDOT:PSS have been attention due to their various applicability. However, the electrospinning of only PEDOT:PSS is not easy due to its poor viscosity to form fibrous materials. To increase the spinnability of PEDOT:PSS solution, a blend of additional polymer is necessary and the polymer should be water soluble because PEDOT:PSS is suspended in water medium.

In this work, two different methods for constrained and unconstrained annealing were compared to investigate the effect of annealing methods on the electrical conductivity of PEDOT:PSS/polymer composite nanofibers. Two water soluble polymers of polyvinyl alcohol (PVA) and poly(ethylene oxide) (PEO) were selected to blend with PEDOT:PSS solution.

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Investigation of tensile and flexural behavior of coconut fiber reinforced fresh/recycled high density polyethylene

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The study deals with the evaluation of tensile and flexural properties of coconut fiber reinforced high density polyethylene (HDPE) composite for varying amount of coconut fibers. The specimens for tensile and flexural tests are fabricated in accordance to ASTM standards. Prior to fabrication of composite specimens, the surface of coconut fibers is chemically treated with 8% NaOH and 10% Maleic Anhydride solutions so as to improve the interfacial adhesion between coconut fibers and HDPE matrix. The results obtained by conducting tensile and flexural tests on composite specimens are compared with the specimens made of 100% virgin HDPE and 50-50 mixture of virgin and recycled HDPE. The study reveals that the tensile strength reduces when HDPE matrix is reinforced with coconut fibers. The tensile strength of the composite decreases respectively by 25.8% and 25.5% on reinforcing HDPE matrix (50% virgin and 50% recycled) with respectively 10% and 30% coconut fibers. However, the flexural strength increases with the reinforcement of coconut fibers into HDPE matrix, having equal proportion of virgin and recycled HDPE. The flexural strength of composite containing 20% and 30% coconut fibers are respectively higher by around 2.72 MPa and 1.99 MPa when compared with specimen made of 50-50 mixture of virgin and recycled HDPE. SEM observations of the tensile fractured surface of the composite specimens reveal that the fiber pull-out and fiber breakage are the primary failure mechanisms.

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