PE12) Highly Transparent UV-Curable Nylon 6 Nanofiber Reinforced Polyurethane Acrylate Nanocomposite

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1. Introduction

Electrospinning is the versatile and simplest method to produce continuous nanofibers with diameters ranging between few micrometers to nanometers. Nylon 6 possesses high tensile strength with elasticity, toughness and abrasion resistance. As well as it is having a similar refractive index with PUA and it would be beneficial for transparent nanocomposite. The interfacial properties of nylon 6 nanofiber and PUA resin greatly impacts on the mechanical strength of the composite.

2. Method

The fabrication of nylon 6/PUA nanocomposite consists of three steps: casting, electrospinning, and UV-curing. After realizing the parameters for the bead-free morphology of nanofibers, these nylon 6 nanofibers were randomly electrospun on the PUA casted glass plate for a specific time of period to get appropriate gsm (gram per square meter). After deposition of the nylon 6 nanofibers, this wet composite was moved to air tightened metallic mold and cured in the UV-curing machine.

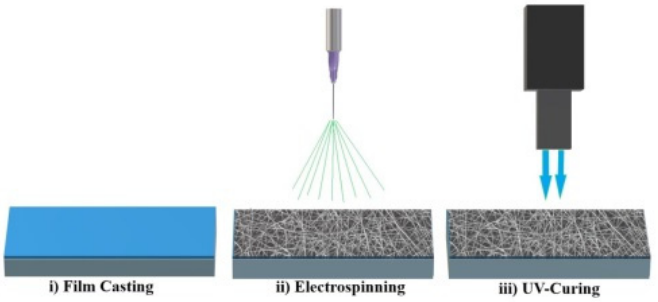

Fig. 1. Schematic presentation of nylon 6/PUA nanocomposite film fabrication method.

3. Result and discussion

Process parameters for the production of nylon 6/6 nanofibers were optimized to: an applied voltage of 25 kV, a needle-to-collector working distance of 150mm, and a solution feed rate of 0.3mL/h. The properties of nylon 6/PUA nanocomposite films with 8, 15, and 30 min of deposition of the nanofibers will be evaluated in comparison to the reference UV-cured PUA film. In the evaluation part, we determined mechanical properties as well as hardness, wettability, and adhesive properties are required to verify in case of surface validation.

감사의 글

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